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TUBERCULOUS PLEURISY WITH EFFUSION

I. THE BIOLOGIC AND INVESTIGATIVE ASPECT

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Even a casual examination of any of the great cavities of the body that are bounded by two surfaces of serous membrane, such as the peritoneal, the pleural, or the pericardial cavities, reveals the fact that these surfaces are provided with sufficient fluid to enable them to glide over each other without friction. There is neither too much nor too little fluid. The space between the cavities is never sufficient to be classified as an effusion. It is evident that some controlling mechanism must exist which permits of transference of fluid from the blood stream into these spaces and of resorption of fluids and soluble constituents in the opposite direction. If this were not true, these spaces would either soon become filled with fluids, or, if resorptive processes were in control, they would become entirely dry. Trauma brought about by bacterial, chemical, thermal, or other, factors may readily disturb the normal equilibrium, so that effusions are produced. One should anticipate that reaction to stimuli, of whatever character, would be approximately the same because such varied types of stimuli affects a mechanism of defense which in the main is a standard one. The differences in the response to different stimuli are differences in the detail of the reaction and not in its principle.

Pinner and Moerke undertook an exhaustive research to determine whether the permeability of the diseased pleura is changed in such a way as to inhibit the free exchange of substances between the blood and the pleural space. They accepted what seems to be axiomatic, that free exchange of substances is necessary for the maintenance of normal conditions. It was clear to them that deviations from equality of concentrations of the normal constituents of the blood and of the pleural fluid, would indicate changes in permeability. To determine these deviations, they made an analysis of all physical and chemical characteristics of pleural effusions and compared them with blood taken at the same time. They were able to confirm, to restate, and to suggest that the pleura in its normal state is permeable in either direction to chemical constituents of the blood, but that the permeability is not of the same quantitative order for all constituents, and, finally, that the normal pleura tends rapidly to resorb artificially introduced fluid. They brought evidence that the pleura acts as a semipermeable membrane which offers resistance of variable degree to the passage of diffusible substances and that fluids of variable tonicity are made isotonic with the blood, when resorption occurs and normal equilibrium is again established.

THE REACTION OF DEFENSE AGAINST TRAUMA

The equilibrium normally existing between permeability and resorption can readily be broken and the reactions brought about by traumatism can be studied. Higgins and I studied the effect of a colloidal suspension of graphite introduced into the pleural space. We found that such a fluid excited an immediate response. Evidently there was an immediate alteration of permeability, permitting rapid passage of fluid into the pleural space. Using a dog, within twelve hours after injection of as little as 15 c. c. of suspension of graphite into one side, both pleural spaces will contain three or four times as much fluid as was introduced. It will be made up of serum, erythrocytes and polymorphonuclear leukocytes. A few lymphocytes and monocytes

complete the cytologic picture. The polymorphonuclear leukocytes promptly exercise their function of phagocytosis, and within an hour almost every particle of graphite will be intracellular. The percentage of polymorphonuclears in the first few hours is approximately that in the blood stream. The percentage of mononuclear cells, which also are phagocytes, is less than that of the blood, but, as time passes, the polymorphonuclear elements become fewer, they disintegrate and disappear, but the phagocytic monoculear cells increase in number until they become as numerous as the polymorphonuclears were at the onset of the effusion. This reverse of the proportion between the two cellular types of phagocyte is accomplished within seventy two hours, but it becomes apparent within about eighteen hours. Within four days, the fluid is markedly decreased in amount, and within six days the pleural space is empty of demonstrable fluid.

The mechanism of defense seems to include several factors. There is increased permeability; there is also phagocytosis by polymorphonuclear leukocytes, and later by nongranular mononuclear cells, which we believed were first derived from the blood and later augumented in numbers by true histocytes; and, finally, there is resorption, which proceeds with varying speed, apparently very rapidly at first but slower with the passage of time, and accomplished, at least chiefly, by the lymphatic mechanism of the parietal pleura and the mediastinum.

Higgins and I agree with Pinner and Moerke, that inflammatory processes produce increase in permeability, and that the degree of alteration is indicated by the number of hematogenous cells found in incipient effusions. We are unable to state the reasons why complete resorption is relatively so slow. It appears to act rapidly at first, because we have been able to demonstrate graphite within the trabeculae of the sternal nodes within an hour following its injection into the pleural space. It has seemed probable that the speed of resorption is influenced by slowing of the speed of lymphatic circulation, due to overcrowding of the vessels and of the nodes by phagocytic cells and by an abnormally increased volume of serum.

These reactions have seemed to us to represent a normal mechanism of defense which should not be changed in principle, but only in degree, by irritants of any character. We have used many different irritants in colloidal suspension and have introduced them into serous cavities other than the pleura and also into the lung, but the sequence of events has been the same except in minor details. There was accumulation of serum and hematogenous elements, polymorphonuclear leukocytic phagocytosis succeeded by mononuclear phagocytosis, and gradual resorption, especially by the lymphatic system and secondarily by the blood stream.

THE SPECIAL DEFENSE AGAINST BACILLI OF TUBERCULOSIS

When one studies the influence of a living organism on a serous membrane, and its ability to alter permeability to such a degree that effusion is produced, it is soon found that the process is not as simple a one as that described when inert substances are employed. There are introduced such factors as susceptibility, sensitivity, chemical fractions, virulence and dosage, as well as the viability and pleomorphic forms of the bacteria employed. The end result is the same; the same mechanism of defense is set in action, only the details of the reaction are different.

With the assistance and advice of Feldman and Montgomery, experiments were undertaken to discover the reactions of the pleura of various types of animals to bacilli of tuberculosis of bovine type. The work is still in progress, but the results of representative experiments on both healthy animals and sensitized animals will be recorded. The animals used were dogs, rabbits and agoutis.

Experiment 1.—A normal, healthy dog was used to discover the reaction of the pleura of the nonimmune animal to the bacillus of tuberculosis. A virulent strain of organisms of bovine tuberculosis was employed, and the animal was inoculated intrathoracically with 15 c. c. of a heavy suspension of these organisms in physiologic saline solution. There was no immediate reaction to the injection. Twenty-four hours later the animal was killed and examined, but all organs appeared to be normal and no fluid had formed in the pleural space. Both the costal and visceral pleura appeared to be entirely unaffected, and it seemed apparent at the time that the bacillus of tuberculosis does not cause irritation that will disturb equilibrium sufficiently at the time of injection to bring about an effusion. In this respect the bacillus of tuberculosis differs from such inert substances as particulate graphite.

Four weeks later, however, when tissues were prepared for microscopic study, exudates were discovered adherent to the costal pleura and to the diaphragmatic pluera. These were made up of polymorphonuclear and a few mononuclear cellular elements, which exhibited characteristic phagocytic reaction. These cells were filled with bacilli; the mononuclear cells were literally packed with organisms. Intracellular organisms were also found within the lung, tracheobronchial, paratracheal, and sternal lymph nodes, and in the mediastinal tissue,

but not in any of the abdominal viscera. Their presence in all tissues, however, was suspected, and cultures made from the tissues enumerated and from the kidney, liver, spleen, and suprarenal glands, were found to be positive, each giving a well-defined and characteristic growth of acid-fast organisms.

In this nonimmune animal there was no effusion, but within twenty-four hours the necessary pleural lesion had been produced, making an effusion possible when irritability produced by a developing lesion or by secondary infection from the lesion, became sufficient to disturb the forces of permeability and resorption.

Experiment 2.—This dog received, on the same day (February 15, 1932), a similar intrathoracic inoculation of the same strain of bacilli of bovine tuberculosis at that given the dog used in experiment 1. It was examined fluoroscopically from day to day, but no evidence of fluid appeared in the pleural space. Three days following the initial inoculation of 15 c. c. of a suspension of bacilli of tuberculosis in saline, a second inoculation was given, but only one-third the amount was used. Ten days later the animal was still free of any evidence of effusion.

After five weeks had passed, the dog seemed to be in good health, except that it had begun to lose weight, and at this time it became weakly positive to tuberculin. At this time of writing this paper, after two months have elapsed, he is still only weakly positive to tuberculin, but he is definitely tuberculous. April 14, roentgenoscopic examination gave evidence of a small effusion. This was permitted to remain and increase in amount for the following five days. Then roentgenoscopic and physical examination gave evidence that a massive effusion had occurred, and the dog was obviously ill and its respiration embarrassed. Of this watery, straw-colored, serous fluid of specific gravity 1.015, 350 c. c. was removed from the right pleural space and was preserved for examination of cellular characteristics and for presence of evidence of phagocytosis of bacilli of tuberculosis. The fluid did not clot on standing. It was sterile for pyogenic organisms, and on examination of stained smears the cytologic picture was found to be composed of 56.5 per cent of polymorphonuclear cells, 6 per cent of mononuclear cells and 37.5 per cent of lymphocytes. Examination of the nuclei of the polymorphonuclear cells disclosed very definite evidence of a shift to the left, probably indicative of rapid formation or immaturity. Leukocytes numbered 4,700 in each cubic millimeter of the fluid. In the blood, leukocytes numbered more than 30,000 in each cubic millimeter of blood.

When smears were prepared and stained by the Ziehl-Neelsen method, a few of the polymorphonuclear cells were seen to contain occasional bacilli of tuberculosis, but every mononuclear cell exhibited very strong phagocytosis and was literally packed with bacilli of tuberculosis.

This experiment was designed to simulate as closely as possible cases of tuberculous pleural effusion of rather brief duration. Polymorphonuclear leukocytes dominated the cellular picture, phagocytic activity was most evident in the mononuclear cells, and the percentage of lymphocytes was three times as high as in the circulating blood. The fluid was serous, of low specific gravity, and contained very little fibrin.

Experiment 3.—In December, 1931, a rabbit was injected intravenously with an emulsion of bacteria grown from urine of a human being. Three months later, when it was known to be sensitized, it received an intrapleural injection of 1 c. c. of an emulsion of living bacilli of tuberculosis of bovine type (No. 1146 Feldman's strain). The day following, it was examined fluoroscopically but no evidence of fluid was found. Small amounts of fluid are so difficult to discover roentgenoscopically in these small animals that a needle was inserted in the pleural space. No fluid was aspirated.

The animal was examined from day to day, and was given another injection six days after the first. The second inoculation consisted of 3 c. c. of an emulsion of bovine bacilli of tuberculosis similar to that used at the first intrapleural inoculation. Immediately after injection, the animal was examined fluoroscopically, but no fluid could be discovered. One hour later it was killed, and necropsy was performed at once.

The pleural space on the right side was moist, and on the parietal pleura small agglutinations of fibrin could be seen, appearing as yellowish white clots that probably represented the results of the previous injection. A certain degree of inflammatory reaction was apparent, with a rather sticky exudate covering the costal as well as the visceral pleura and the mediastinal tissues, but the amount of fluid was extremely small. There was much less than 1 c. c. in both pleural spaces. There was, however, enough so that a cell count could be made and smears prepared for histologic purposes. The cell count of the exudate was extremely interesting. The total number of leukocytes was only 12,600 in each cubic millimeter, and the differential count was as follows: polymorphonuclears, 71 per cent; small lymphocytes, 17 per cent; large lymphocytes, 8 per cent; mononuclears, 4 per cent. Examination of the nuclei of the polymorphonuclear cells disclosed that the shift was to the left. Smears were made from the thick, seropurulent, blood-stained effusion. On examination of smears stained by the Ziehl-Neelsen technic, some striking pictures were obtained. All of the bacilli of tuberculosis were phagocytosed. None was found free on the smear. Two types of phagocytic cells were observed; namely, the polymorphonuclear and the mononuclear, and the former predominated in numbers. It was apparent that the polymorphonuclear cell had phagocytosed fewer bacilli than the mononuclear cell, and that, even within the period of time of the experiment, they had already begun to disintegrate. Many fragile broken forms were seen. The mononuclear cells, in many instances, were literally packed full

of bacilli, whereas those which seemed to be free of bacilli had phagocytosed fragments and large portions of broken up polymorphonuclear leukocytes. When smears were stained with Wright's stain, and examined microscopically, one could actually see within the mononuclear phagocytic cell the form and substance of the polymorphonuclear nucleus, as well as the granular substance that is found in its cytoplasm. Evidently phagocytosis was an extremely rapid process, making possible quick disappearance of the bacteria from the pleural surfaces. The mechanism seems the same as that which is employed with inorganic substances. There is immediate polymorphonuclear leukocytosis, early disintegration of the cell, and very active mononuclear phagocytosis of both bacilli and cellular debris.

The microscopic appearance of the lung and visceral pleura was of particular interest because of the presence of adherent exudate, and of one cellular accumulation that appeared to represent a tubercle in the process of development. The exudates were composed of mononuclear phagocytic cells, and of polymorphonuclear cells which occasionally give evidence of phagocytosis of bacilli of tuberculosis. In the mononuclear cell the phagocytic action was particularly active, and many of these cells were literally crowded to the point of rupture with bacilli.

In that small bit of exudate that had taken on a spheric form, the cellular elements were similar to those already described, but a concentric arrangement had begun. The outer zone consisted of small mononuclear cells which appeared to be lymphocytic in character; the inner zone was made up of mononuclear cells of epithelioid appearance, but they had retained their phagocytic function. No central necrosis or giant cells were present, but the appearance was essentially that of the typical histologic tubercle which had grown on and become an integral part of the visceral pleura.

Experiment 4.—An agouti was treated in the same way as the rabbit. It was sensitized, and its pleural space was inoculated with the same strain of bacilli of tuberculosis. For more than a month, repeated examinations failed to give evidence of any pleural disease, but, five weeks after the initial intrapleural injection, opacity was observed roentgenologically and it became certain that fluid was collected in the pleural space. The animal was killed after four weeks more had passed, giving time for the pleural effusion to develop characteristics of a chronic process, especially from the cytologic standpoint. The animal was found to have a massive bilateral effusion, associated with a very advanced type of tuberculosis of the pleurae, mediastinum, and lymphatic structures. The fluid filled both sides of the thorax, causing the upper lobes of the lungs to be atelectatic and in collapse. It was of serosanguineous type and clotted promptly. Cellular elements were few in number, and the differential count was as follows: polymorphonuclear cells, 37.5 per cent; mononuclear cells, 7.5 per cent; eosinophils 1 per cent and lymphocytes 59 per cent. Few bacilli could be found on examining the smears made from the exudate. An occasional mononuclear cell contained phagocytosed bacilli, but only one polymorphonuclear cell that exhibited phagocytosis was found. It contained only two bacilli of tuberculosis.

THE MECHANISM OF PRODUCTION OF THE SENSITIZING TUBERCULOUS LESION IN MAN

The question regarding the necessity for sensitization previous to formation of effusion has been studied by Petroff and Stewart, Corper and Rensch, Krause and other workers. There seems to be an agreement in fundamental conceptions but not in results under the conditions of their experiments. In my uncompleted work, using both sensitized and nonsensitized animals, effusions or exudates have been produced as a sequel to the introduction of living organisms into the pleural space in every case. In man, after reaching young adult life, no great concern may be felt regarding the question of sensitivity. Almost all have been sensitized, and, in all probability, sensitization has been repeated time after time throughout life. It is probable that bacilli of tuberculosis are introduced into the body of man repeatedly, and that no one escapes. The nature and physical characteristics of the lesion, however, are variable, sufficient or not to cause subjective sickness, and sufficient or not to be demonstrable. Fundamentally, however, the unit or tubercle is the same, and represents the reaction of tissue to invasion by a foreign irritant.

This reaction is a standard one and in principle the same regardless of the irritant. When a suspension of graphite is placed in the mouth of an anesthetized dog and aspirated into the lung by the force of inspiration, it sets up the mechanism of defense at once. The reactions within the lung are almost the same as those described as taking place in the pleura. There is a notable exception. In the pleura, the first phagocyte to appear after permeability is increased, is the polymorphonuclear cell. In the lung, the "alveolar cell" seems to be the first and most active phagocyte. It is already at the site of irritation and does not require mobilization from circulating fluid. The polymorphonuclear cell promptly succeeds and assists the alveolar histocytes, and later the histocytes of the parenchymal connective tissue appear. The reactions are swift and certain. Within forty minutes after introduction of various kinds of particulate-matter into the mouth of a dog, I have found it phagocytosed by all of the cellular forms described, an alveolitis established throughout the parenchyma of the lung, and an accumulation of polymorphonuclear cells and non-

granular mononuclear cells, all laden with engulfed particles, lying in the farthest reaches of the lung, in the subpleural spaces.

When using silica as the irritant, these same reactions have occurred within a few hours, and within a week nodulor masses histologically similar to tubercles, have made their appearance. They are made of the same cytologic elements as those produced by the bacillus of tuberculosis and are to be found throughout the lung and reach the periphery. Many appear to be covered only by the thin pleural membrane.

The reaction of the bacillus of tuberculosis is fundamentally the same when it produces its tubercle and establishes thereby a state of sensitiveness to reinfection. One cannot fail to recognize the progressive cellular changes and their conformity with a fundamental scheme of defense.

Gottlieb, studying the reactions of the peritoneum of guinea pigs, to invasion of virulent organisms from a strain of bacilli of tuberculosis derived from man, concluded that the monocytic reaction in a tuberculous infection should be considered at least as an attempt at protective mechanism.

Long, Vorwald and Donaldson studied the reactions of virulent bacilli of tuberculosis after injection into the testes of normal and tuberculous guinea pigs. They observed: "Between twenty-four and forty-eight hours after the inoculation with live bacilli, a gradual replacement of the polymorphonuclear leukocytes by large mononuclear exudate cells occurred in all animals. Extensive phagocytosis of polymorphonuclear leukocytes by large mononuclears took place." After seventy-two hours, they observed that the familiar picture of scattered, early tubercles composed of mononuclear cells was present, and that with maturity, or after about two weeks, these large mononuclear cells took on themselves the appearance of typical epithelioid cells. This is what Higgins and I observed when using silica as the irritant. However, there was this difference. Long, Vorwald and Donaldson found that already-present tuberculosis greatly accelerated the reaction capacity of the polymorphonuclear leukocytes, and that previous inoculation, even with dead bacilli, brought about a similar allergic state although the acceleration and increased intensity of inflammatory reaction over that seen in the normal animal are not nearly so great as in the truly tuberculous animal.

Vorwald's conclusions were substantially the same, although he emphasized the early reaction of polymorphonuclear leukocytes as the initial cellular response to a moderate dose of bacilli of tuberculosis.

Cunningham, Sabin, Sugiyama and Kindwall, Cunningham and Tompkins, and Lurie and Krause have considered the relative importance of the polymorphonuclear cell and of the mononuclear cell. It is probably correct to infer from all the studies now available that the disease set up by the bacillus of tuberculosis is chronic, and that the specific lesion is a new growth of mesenchymal elements of which the most significant cell is the mononuclear cell, which in time matures into the epithelioid cell, and, when active development and division of bacilli is stopped, giant cells make their appearance, and are derived from the epithelioid cell. This typical lesion results in all organs and in all the varieties of animals employed, whenever tuberculous infection exists. Fried has shown the extreme speed of the reaction of pulmonary tissue against bacilli of tuberculosis. He stated: "Infection of rabbits with the bovine type of tubercle bacilli by way of the trachea, provokes an instantaneous reaction in the lungs. The early lesion, that is, 'the primitive tubercle' is found in the lung within five minutes after aerogenous infection."

Petroff and Stewart have studied the allergic reactions of sensitized animals, which, judging from Paterson's work, seem to be required before introduction of living organisms into the pleural space can so disturb permeability as to permit of initiation of a train of defensive phenomena resulting in formation of an effusion. They realize that it was impossible to carry out on man experiments similar to those employed with animals, in which controls usually can be obtained. As a resut of their investigations, however, they concluded:

"1. That virulent human tubercle bacilli in fine suspension in gum saline (7 per cent acacia in physiologic saline) solution injected intrapleurally on the right side into normal rabbits, tend to clump and form clusters of tubercles especially toward the lower or anterior portions of the right pleural cavity and on the right lung and toward the mediastinum.

"2. That there does not seem to be any difference in the gross final results of the intrapleural injection of the living virulent human tubercle bacilli, regardless of whether the rabbits have received either a subcutaneous or an intravenous (sensitizing) injection of the same culture.

"3. That in rabbits there is no more tendency to form pleural effusions or an empyema following the intrapleural injection of virulent (for guinea pigs) human tubercle bacilli in those animals having received either a subcutaoeous or an intravenous injection of the same culture of tubercle bacilli one

month prior to the intrapleural injection, than in a normal rabbit not having received such preliminary sensitizing injection; thus making it impracticable to use this method in the rabbit for the production of tuberculous effusions or empyemas for experimental therapeutic or other studies."

IMMUNITY IN MAN

In Sewall's brilliant essay on the psychic analogues of allergy, he wrote: "When a foreign protein comes in a contact with the tissue cells of a normal organism, these become irritated and enter upon a cycle of unwonted metabolic change, the results of which appear in a week or two. The first of these results is a specific hypersensitiveness toward the foreign protein in question so that thereafter infinitesimal quantities of the latter may be able to irritate the cells. Experiment has made it obvious that the acquirement of specific sensitization goes hand in hand with the development of extraordinary powers within the tissue cells for rapid destruction, digestion or neutralization of the offensive foreign protein."

With these words he introduced his discussion of and distinction between immunity and allergy. He made the distinction more clear when he wrote: "There are doubtless several ways by which the biological status of immunity may be attained, but only one concerns us here—that, namely, in which the foreign protein or 'antigen,' as it is called, on entering the normal body has been able in the course of a few days to excite the latter to develop essentially new vital power objectively witnessed by specific hypersensitiveness and defensive antibody reactions. The normal body which has undergone such a course of cellular training is now said to be 'immune' toward that particular antigen or microbe which started the disturbance. It is characteristic of the immune state that the body which has acquired it responds at once with defensive reactions calculated to inhibit or destroy the irritating antigen whenever thereafter the latter makes a new invasion. . . . . Allergy implies a defensive reaction against a particular antigen in a prepared subject."

There is, therefore, a most intimate relationship between immunity and allergy. Willis summarized the laws dealing with specific immunity to tuberculosis. as follows:

"(1) There is no specific immunity without preexisting tubercle; (2) immunity first appears with the palpable development of the focus; (3) it diminishes with the healing of the focus; (4) it disappears with the enucleation of the focus; (5) the degree of immunity varies directly with the virulence of the immunizing micro-organism, or, otherwise expressed, with the amount of tubercle and activity of the lesion in the host.

"As regards allergy, we find that: (1) it is never observed unless tubercle is present; (2) it appears coincidentally with the establishment of lesion; (3) it diminishes as lesion heals; (4) it varies directly with the intensity of the disease, which, in turn, is dependent, not wholly but in large measure, on the virulence of the bacilli concerned."

Krause summarizes his opinion regarding immunity and allergic reactions by saying: "In every established tuberculous infection, we may think of every increase of intrafocal tubercle bacilli, or every conveyance of bacilli beyond their focal bounds, as met by allergic reactions. In the vast majority of countless instances the number of bacilli concerned are too small to lead to appreciable or sensible effects. Their fixation, immobilization, and perhaps partial or complete destruction, are accomplished This end result is conceived by us as immunity."

When bacilli are suddenly discharged on allergic tissue such as the pleura made sensitive by previous infection, the response is characterized by acute inflammatory reactions and changes in permeability so that fluid may be formed and a pleural effusion produced. The degree of inflammatory reaction is variable, it may produce only malaise, or it may, suddenly and without warning, cause florid symptoms of alarming intensity.

Such accidental conveyance of bacilli from a tuberculous focus to the sensitized pleura of man, may occur on one occasion or repeatedly in the course of disease, and the severity of the allergic reaction may bring about an insidious or an abrupt onset of illness, either of mild degree or of fulminating character with the production of effusions containing variable cellular constituents. Those containing at the onset of the effusion the largest number of red blood cells and of polymorphonuclear cells, usually seem to be an expression of the most intense allergo-immune action, and are found when the illness is of severe and dangerous character.

EVIDENCES OF INFECTION IN MAN

When Corper and Rensch repeated Paterson's work, they were unable to confirm his findings; namely, that normal animals failed to develop pleural effusions when given intrapleural inoculations of bacilli of tuberculosis, while such injections into tuberculous guinea pigs resulted in exudation of serum, of leukocytes, of erythrocytes, and of fibrin. Corper and Rensch have expressed the same belief as that which I hold; namely, that there is available no

method which can ben relied on to produce a replica of the condition found in man. From clinical observation, serologic reactions, and pathologic examination, however, it seems reasonable and proper to believe that pleurisy with effusion in man occurs only in such persons as have been previously sensitized, or, in other words, as are immune. The pleurisy and the effusion are the visible evidences of allergy.

There is only one conflicting bit of evidence. If there is truth in these conclusions, then the anatomic changes in the pleura resultant on secondary infection, should be accompanied by symptoms as well as local reactions of inflammatory type. This is almost always true; pain, fever, malaise, and effusion constitute the syndrome. But McPhedran wrote: "Small and moderate effusions are not uncommonly discovered in routine serial roentgenographs of children living in contact with sputum-positive tubtrculous persons. Below the age of puberty, these lesions in white children may appear and clear without symptoms or elevation of temperature and without the later development of pulmonary infiltration. In colored children of this age period, effusions are more often accompanied by dense pleural thickening and infiltration of the lung that produce symptoms." Montgomery found costophrenic adhesions, on roentgenologic examination of Canadian Indian children, in about 30 per cent of cases. These gave no history suggestive of tuberculosis, although 100 per cent had contacts with tuberculous relatives. Either, among children, the effusion may represent a first infection, which is improbable, or the symptoms produced are so mild as to make detection impossible.

The significant facts regarding immunity and allergy, however, have been stated by Hetherington, McPhedran, Landis, and Opie, in their report on the incidence of tuberculosis among children attending the schools of a large city. By studying the reaction to tuberculin, they found that infection occurred before the fifth year in 80 per cent of the children of families in which a member had open tuberculosis, and in only 20 per cent of the children of families not harboring a source of contagion. These figures emphasize the danger of intimate contact. But intimate family life among those harboring members having open lesions is not necessary, because, among families free of disease, the positive tuberculin reaction increased gradually from zero in infancy to almost 100 per cent at the age of twenty years. In a further survey to determine the prevalence of tuberculous infection in school children, they were able to make the following report:

"(1) Tuberculin tests of school children of Philadelphia show that 37.7 per cent are infected with tuberculosis at the age of five years, and 90.2 per cent at the age of eighteen years." These figures indicate that there has been no significant diminution of the incidence of tuberculous infection during childhood to correspond with the diminution of mortality from tuberculosis in recent years.

"(2) Pulmonary tuberculosis recognized by roentgen examination in association with symptoms and physical signs, is found in 0.5 per cent of children attending school, being more frequent in high-school children than in children of elementary schools.

"(3) Latent tuberculous infiltration of the lung of childhood type, was found in more than 1 per cent of the children. The lesion may be the precursor of grave disease.

"(4) Latent tuberculous foci in lungs and tracheobronchial lymph nodes are found in more than 10 per cent of the school children. It may be the precursor of pulmonary tuberculosis."

Hewitt and Cutts completed their recent inquiry regarding the incidence of tuberculosis among high-school students of a small city, and compiled the following table:

SUMMARY OF RESULTS

		Tuberculin tests				Roentgenograms			
		Given		Positive		Made		Positive	
	Students	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Entire student body	1,565	1,328	84.2	154	11.5	152	98.7	23	15.1
Submitted to intensive study	54	54	100.0	24	44.4	47	77.0	7	14.8
Known to have been exposed (part of group of 54)	34	34	100.0	21	61.8	34	100.0	3	8.9
Gave physical signs that aroused suspicion (part of the group of 54)	20	20	100.0	3	15.0	20	100.0	4	20.0

Their summary and conclusions are: "Of 1,328 high-school students, 11.5 per cent gave positive reactions to the Mantoux test. Of thirty-four students definitely known to have been exposed to open tuberculosis, 61.9 per cent gave positive reactions to the tuberculin test. Lesions disclosed roentgenologically were few in number and not extensive. In the general group, 15.1 per cent of those who gave positive cutaneous tests also gave roentgenologic evidence of some abnormality which might be attributed to tuberculous infection. Primary tubercles were present in thirteen cases. Of those who had been in contact with patients who had tuberculosis, 8.9 per cent gave roentgenologic evidence of lesions attributable to tuberculous infection. No case of active or extensive latent tuberculosis was found. However, evidence of tuberculous infection was disclosed. That its most serious menace is to those who live in homes where infection is present, is shown by the much greater percentage of positive Mantoux tests among students from such homes as compared with the lower percentage of positive tests found in the group as a whole."

Unquestionably there are differences in the incidence of tuberculosis in different localities, and when conditions of life vary; yet the literature is full of evidence of the universality of the infection. The evidence is supplied not only from the allergic reaction to tuberculin, but also from the anatomic studies of pioneer investigators of primary disease, of whom Ghon and Opie and Hodenpyl are outstanding. They described the primary lesion as a focus lying in the substance of the lung, often near the pleural boundary, and not more frequent in the apex than elsewhere. Evidence seems to show that these lesions increase in number from above downward, and are more commonly found in the lower than in the upper lobes. They are accompanied by more extensive lesions in the adjacent lymph nodes, which, like the pulmonary focus, may pass through stages of caseation, fibrosis, and calcification. Calcification especially makes it possible to visualize the lesions roentgenographically, and thus to show the frequency of their appearance among apparently normal persons. The evidence of calcification is so commonly seen as to escape comment. Farrel studied the incidence of calcified pulmonary foci and found the following: (1) of 1,034 adult patients whose chests were examined roentgenographically, 801 (77.46 per cent) presented evidence of a primary effect, or of a calcified reinfection; (2) of this group, 750 (72.93 per cent) presented primary effects; and (3) the lower portion of the right lung, the portion which is best aerated, exhibited the highest incidence of calcified foci.

Blocklock recently summarized his opinion regarding the primary lesion in the lungs of children. His data were drawn from 1,800 consecutive postmortem examinations of children whose ages ranged from a few hours to between 12 and 13 years, and who lived in Glasgow and the west of Scotland. Tuberculous lesions were found in 283 subjects (15.7 per cent). The lungs or tracheobronchial lymph nodes were the seat of tuberculous lesions in 173 (61.1 per cent) of the total number of tuberculous patients, and, of these, 168 (97.1 per cent) died as a result of the tuberculous disease. A primary pulmonary lesion was found in 148 of the cases in which the primary site of infection was classified as being in the thorax. The primary pulmonary lesion consisted of a localized patch of caseous broncho-pneumonia, and in the great majority of cases was single. Calcification of these lesions was unusual, and in only about a third was there evidence of surrounding fibrosis, the incidence of which increased with the age of the children. Most of the primary pulmonary lesions were subpleural in position, and the right lung was more often the seat of such lesions than the left; the right upper lobe was most frequently involved, and then, in order, the right lower, left upper, left lower, and right middle. Tuberculous adenitis involving the tracheobronchial nodes was related, both anatomically and pathologically, to the primary lesion in the lungs; involvement of the nodes was secondary to the pulmonary lesion. In twenty-five of the cases in which primary infections were considered thoracic in situation, pulmonary lesions were not found. In a series of cases in which the type of infecting organism was investigated, 173 human and three (2.7 per cent) bovine strains were found in cases in which the primary site of the infection was in the thorax. Only human strains were obtained in cases in which there were primary pulmonary lesions. These features were in marked contrast to those found among children in the same series, with the primary site of infection in the abdomen; among these children 81.8 per cent of the infecting bacilli were of the bovine type; also, in cases of bone and joint tuberculosis, which were caused by blood-borne infection, 34.6 per cent of the causal organisms were bovine strains. From the pathologic and bacteriologic evidence, Blacklock concluded that the focus described as the primary pulmonary lesion is indeed such, and that it is due to direct infection of the lung through the air passages.

Evidence of the presence of a lesion is conclusive

and objectively demonstrable in a high percentage of all cases in which the patients are adults, but the speed with which the lesions have developed is not emphasized. There are three considerations that require comment. The first recalls the work of Fried, who found, as stated before, that formation of a tubercle was an almost instantaneous process, and was completed in the brief period of a few days. This work received confirmation by work now in progress by Higgins and me; we can produce a similar cellular nodule with inorganic material, silica, in the same time and with the same cellular reactions and constituents. The second consideration also recalls previous work. Higgins and I were able to produce immediate and similar pulmonary changes by introduction of colloidal iron into the trachea, and within an hour we were able to demonstrate phagocytosed colloidal iron in the adjacent tracheobronchial lymph nodes and to note the tissue reactions it produced in them. Within an hour and a half, we were able to demonstrate phagocytosed particles of graphite in the most distant of the paratracheal lymph nodes, following intratracheal inoculation of a colloidal suspension.

Finally, there is evidence that the mechanism is not confined to inert inorganic substances, or to pathogenic bacteria which produce a similar chronic new growth of connective-tissue cells, but includes also the acutely virulent pyogenic organisms. Robertson recently examined at necropsy a baby ten hours old that had required artificial respiration, and found definitely demonstrable bronchopneumonia, and a reaction within the adjacent lymph nodes, including not only polymorphonuclear leukocytosis, but also hyperplasia of reticular cells.

It is possible to conclude that sensitization in man is the result of infection with the bacillus of tuberculosis, which excites an immediate response, and sets in motion a defense mechanism that is not specific for tuberculosis but is employed for all invading substances, although subject to variations required by such differences as may be included in the terms of dosage and virulence. It would seem that the initial lesion, a tubercle, is an immediate reaction, that involvement of the adjacent lymph nodes becomes possible by employment of the lymphatic vessels required for disposal of all removable organisms, and that the phagocytic defense is supplied, first, by polymorphonuclear leukocytes which are soon displaced by mononuclear cells and that these become the characteristic cells of tuberculosis.

It would appear that, in man, sensitization by the presence of tubercle is also universal, and that all cases of pleural effusion seen in man are evidences of imbalance or increased permeability, made possibly by the reactions of bacteria or by the products of bacteria on a sensitized pleura.

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TUBERCULOUS PLEURISY WITH EFFUSION.
II. The Clinical Aspect.

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Elsewhere, an attempt has been made to trace the complex reactions of the body against invasion of inert foreign particles, and to compare these with the mechanism of defense against the bacillus of tuberculosis. It has been my opinion that the experimental animal and man have a common mechanism of defense, which includes such factors as tissue permeability, phagocytosis, lysis, resorption, immunity, and allergy. In experimental work, I have been led to believe that this common defensive mechanism is employed, in part or in whole, regardless of the type of irritant, but that variations occur which seem to be due to characteristics that are not the common property of all the irritants. In this category may be included such variables as dosage and virulence of organisms.

In the reactions of the pleura of man against the bacillus of tuberculosis, the question of the importance of previous infection was considered, and evidence both for and against the necessity of previous sensitization was considered in relation to the question of formation of pleural fluid. When this evidence was considered from clinical, serologic, and experimental evidence, it seemed possible to conclude that all the tuberculous effusions of man which occur in adult life appear in those who have had antecedent inoculation with bacilli of tuberculosis, although they may never have been conscious of the infection, nor ever had been made ill as a result of it. It is conceded that the formation of pleural effusions is an accident in the course of the disease, occurring with relative infrequency, and produced by circumstances that are not subject to control. The use of pneumothorax in treatment seems to supply the circumstances or factors of necessity more often than any produced by the disease itself. The inconstancy and unexpectedness of occurrence runs a parallel curve under experimental conditions.

THE INCIDENCE OF PLEURISY WITH EFFUSION

The physical construction of the lung is such that all diseases affecting the parenchyma should also affect the visceral pleura. Thus, reactions of inflammatory type frequently resulting in effusion should be common sequelae of pulmonary disease, whether primary in origin or secondary to disease elsewhere in organs such as the heart, kidneys, or liver. It is common clinical experience that such result obtains. Fluid is usually present in large or small amount in case of pneumonia, pulmonary infarction, cardiac decompensation, hepatic cirrhosis or subphrenic abscess.

The relative frequency of that form which can be definitely proved to be tuberculous must, however, be estimated by anatomic investigation. Two methods are in common use. In The Mayo Clinic, specimens for biopsy are often obtained, and this method results in discovery of a varying percentage of diagnoses of tuberculous pleurisy among patients

with chronic empyema who come for surgical treatment. The percentage of the tuberculous variety is approximately 15, but may in certain series of cases approach 20. In the years following the epidemic of influenza, it dropped to 5 per cent of all cases referred for surgical treatment. Examination of records of necropsy is the other anatomic investigation that can be expected to give accurate information of etiologic factors. Certain reservations must be made. Such reports as come from institutions that do not accept cases of tuberculosis cannot give a true report of the incidence of pleural infection. The cases of tuberculous pleurisy would be in too small proportion, just as the proportion would be too large if determined from records of necropsy made in an institution devoted to the special care of the tuberculous.

Osler's statistical data were obtained from a medical service varying in size from seventy to ninety beds, and on which all types of cases were accepted. He studied 101 cases of pleurisy, and found that thirty-two were definitely tuberculous. This diagnosis was based on the presence of histologic tubercles found in the pleural layers. The tubercles appeared as miliary granulations, caseous masses, or tubercles in which evidence of fibrous change had developed. Of his thirty-two patients, eight had purulent exudate, all in association with pneumothorax; two had hemorrhagic fluid; seven had fibrinous or serofibrinous exudates, and were incidental to acute miliary tuberculosis; four had purely fibrinous exudate and were instances of acute miliary tuberculosis, thirteen had chronic serofibrinous exudate with associated pleural thickening; and four had serofibrinous exudates that were encapsulated. His statistics indicated that fibrinous or serofibrinous effusions were the most frequent, that both purulent and hemorrhagic fluids occurred under certain circumstances in the course of the disease, and that tuberculosis produced about 30 per cent of all pleural effusions.

THE INCIDENCE IN EARLY LIFE

Theoretically, one would expect an extremely small percentage of cases of pleurisy with effusion among patients younger than five years. This is the age of asymptomatic inoculation, and is too early for the mature forms of parenchymal or progressive disease. In special groups of children, including Indians and negroes, such as those reported by McPhedran and his associates, and by Montgomery, the incidence approaches the higher percentages of adult life. Dickey and Garland commented on the rarity of serofibrinous pleurisy among young children until after the fifth year, and quoted from the literature evidence to the effect that those who have effusion have a better chance for recovery than do adults with the same condition. The subsequent development of tuberculosis seems, from this report, to be less frequent among children than among adults. Dickey and Garland made about 700 roentgenograms of 327 children who gave positive reactions to tuberculin, and found an incidence of 71.5 per cent of pleural lesions, but only 3.3 per cent of pleural effusions. They quoted reports of the incidence of pleural effusion among 2,070 adult patients who had tuberculosis, in which the incidence of effusion was only 3 per cent. It would appear that among the tuberculous the incidence of effusion is not materially different in different age groups. Osler believed that tuberculosis accounted for 30 per cent of all cases of pleurisy; Dickey and Garland reported evidence to show that, among tuberculous persons, pleural effusions occur in an incidence of 3 per cent.

MATERIAL

In this paper comment on the clinical manifestation of pleurisy with effusion will be restricted to three groups of cases. Group 1 was composed of twenty cases, in all of which the effusion was proved to be tuberculous by inoculation of guinea pigs. Group 2 was made up of twenty cases, believed to be satisfactorily diagnosed although proof of tuberculous effusion was not absolute; in 50 per cent of these, reports of inoculation of guinea pigs were positive, in 20 per cent, reports of inoculation of guinea pigs were negative, and in 30 per cent the inoculations failed to give positive evidence because of the premature death of the guinea pigs. Group 3 was composed of 126 cases in which examination was made at the clinic and on which Gaarde reported two years ago.

Group 2 included only patients who have been under my personal observation and supervision for from three to ten years. I saw the subjects of group 1, also, but either not for so long a time, or else only in consultation.

The division into groups will be employed only when contrasting differences in end results. All groups are too small to be employed for statistical purposes. Among the 166 cases in the three groups there were no significant differences in the antecedent histories, in the progress up to the time of examination, in the character of the effusion, or in the known presence of antecedent tuberculosis.

None of the patients had active, demonstrable, pulmonary tuberculosis on admission. The effusions were all spontaneous, of primary type; they were not secondary to pneumothorax or traumatism, and were, with few exceptions, of simple serous type. It was found difficult to describe the effusion exactly, or to divide them into serous, scerofibrinous, hemorrhagic and purulent types, and no such sharp distinction will be employed. Reference will be made, however, to certain cases in which hemorrhagic or purulent characteristics seemed to predominate, and to be the result of certain variations in the severity of the disease.

The description of types which follows obviously has no relation to the division of the material into groups. Any one type may include cases of all groups.

GENERAL DESCRIPTION OF FOUR TYPES OF CASES

Acute tuberculous pleurisy with effusion, with subsequent chronic course or return to normal health (type 1).—In this type have been included cases which seemingly began without antecedent illness and without known infection previously existing in the lungs or pleura. Ten of the forty cases began acutely; pain in the side, chill, and fever were the initial symptoms. Exposure did not seem to be the exciting cause. The illness was as abrupt in onset as lobar pneumonia and in several instances the first diagnosis was pneumonia or influenza. The pain was acute, lancinating, increased with respiratory movement, was productive of shallow, rapid, guarded breathing, and required voluntary protection by pressure. It was introduced or accompanied by chilliness, or even by distinct rigor. Cough developed that usually was nonproductive, especially at the onset, and that later was productive of a small amount of mucoid sputum. Fever began abruptly and was of intermittent type and with morning and afternoon variation from 98° to 104° F. Usually, throughout the long course of acute symptoms, the curve of temperature lay between 100° F. in the morning and 103° F. in the afternoon. Two of my patients had such a fever continuously for the fourteen weeks of their acute illness. The curve of pulse rate corresponded roughly with that of temperature, having a range of 80 to 130 beats each minute and an average of 110. Tachycardia continued for six to eight weeks after the temperature reached normal limits, and the rate was subject to many extrinsic factors. Among the women, both temperature and pulse rate were increased during subsequent menstrual periods, and the pulse rate especially was caused to fluctuate by such minor influences as fatigue, excitement, or nervousness. Sweating, more or less profuse, and chilliness endured throughout the earlier weeks of the acute illness.

In certain cases, complete studies of blood chemistry were made without finding any very suggestive alterations from normal. In one instance, however, albuminuria and hematuria occurred and studies of the blood were made. Bloor I and II tests for cholesterin gave results that were within normal limits. There was 64 mg. of lecithin in each 100 c.c. of blood (normal 80 to 120 mg. in each 100 c.c. of blood). The value for fatty acids was 222 mg. in each 100 c.c. of blood (normal, 100 to 130 mg.) and for total acids, 399 mg. in each 100 c.c. of blood (normal, 200 to 300 mg.) The values for blood urea, serum protein, serum albumin, nonprotein nitrogen, creatinine, chlorides, and carbon dioxide combining power were within normal limits. With the subsidence of acute symptoms and the reduction of fewer to normal limits, the albuminuria disappeared.

During the period of acute illness the weight is reduced, often rapidly, varying in degree from 10 to 25 per cent of normal body weight. The reduction seems to be the result, not only of continued fever, but also of the nausea, vomiting, and anorexia that affected those who were most acutely sick. Dyspnea was not a prominent symptom after the initial accumulation of fluid. While the patients were in bed, respirations even of those seriously sick were only 18 to 30 each minute. The rate was rarely more than 30 each minute, even when the temperature was highest and when fluid was present in large amount in the plural space.

With the return of health, these patients of types 1 and 2 gained weight and strength rapidly, a sense of well-being developed, and within a period of six months to a year they were able to return to their normal occupations. The element of time varied greatly, although a year was the average period of observation. In three cases of my series (group 2), observation, however, continued over three to four years. Type 1 included the cases in which the fluid became encapsulated and failed to be absorbed and those in which evidence of pulmonary tuberculosis, tuberculous peritonitis, Pott's disease or urogenital infection developed.

Secondary and terminal acute tuberculous pleurisy with effusion (type 2).—In the last ten years I have observed four cases of this severe type of the disease. Undoubtedly such cases are not very rare, but they do not often come to my attention. They

are seen most commonly in sanatoriums or by family physicians. The parenchymal lesion was not discovered at the onset of pleurisy in any of the cases.

More commonly, the pleurisy sets in insidiously, and may be the outstanding symptom of illness. The onset, however, may be abrupt, with high fever, severe pain, cough, dyspnea, and rapid accumulation of fluid. There was nothing characteristic about the fluid when first obtained, to indicate that the cases would follow an extremely severe course and terminate fatally.

In three of the four cases, the sickness came abruptly, while health was thought to be excellent, and without any suggestion of pre-existing pulmonary tuberculosis. However, one patient had had a pleural effusion two years previously, and aspiration elsewhere had been performed on five different occasions. In the course of this illness, bacilli of tuberculosis had been discovered in the sputum. This information was obtained from the examining physician long after the onset of the illness. In each of the cases in which the patients had been considered to be free of pulmonary tuberculosis at the onset, positive evidence of infection within the lung appeared previous to death and the course of the disease was rapid and progressive. In one instance the pleural effusion was first of serous type, but later became sanguineous; then axillary and cervical adenopathy occurred, a tuberculous abscess developed over the manubrium, and the pleura itself became enormously thickened. In the second case, renal deficiency appeared during the height of fever, albumin was present in the urine, the value for urea was found to vary from 80 mg. to 132 mg. in each 100 c.c. of blood, the value for creatinine varied from 2.3 to 3.9 mg. in each 100 c.c. and the excretion of intravenously injected phenolsulphonphthalein from both kidneys taken together was 10 per cent in one hour. The course of illness was so suggestive of typhoid fever that tests were employed before excluding this condition in diagnosis. The third and fourth patients followed a course more nearly typical of Osler's description. They responded within a few weeks of treatment, recovering a measure of health, but soon became acutely ill again. The subsequent course was suggestive of miliary tuberculosis; it was always alarming and progressive, and continued until death occurred. One patient died within seven months of the initial sickness and two months after delivery of a baby; the other died one year after onset of the discerned onset of the disease.

Acute tuberculous suppurative pleurisy (type 3). Although artificial, this classification is adopttd for the third type, not because it illustrated any significant difference from other types of severe acute tuberculous pleural effusion, except in the initial development of purulent effusion and in the tendency to a severe course and rapidly fatal termination. Of the six patients who died in my series of forty cases (groups 1 and 2), two had a purulent exudate when aspiration was first performed. Although the etiology is the same, it has seemed that the production of bloody fluid, and of purulent fluid, indicates a severity of reaction greater than when serous effusions are produced, and that such fluid may represent the effect of a severely acute infection, either due to vast numbers of bacteria, or bacteria of unosual virulence.

The onset of the illness may closely simulate pneumonia, starting abruptly with rigor, severe pain, leukocytosis, and the immediate formation of a purulent effusion, which may contain large numbers of bacilli of tuberculosis. There is no intervening period of normal health following the onset. The disease is acute, alarming from the start, progressive, and continues until death occurs. The two patients who had purulent exudates when aspiration was first performed, mentioned in the preceding paragraph, survived three and four months respectively after the onset of acute symptoms.

Subacute tuberculous pleurisy with effusion (type 4).—This includes a large percentage of all cases, whether of the so-called primary sort in which there was no previous knowledge of a tuberculous lesion, or of the secondary sort, developing among patients having either active or quiescent pulmonary tuberculosis. Fourteen of forty cases were classified in type 4. In sanatoriums, where pneumothorax constitutes one of the most important and frequently employed types of treatment, pleural effusions of this variety are common, and impossible of anticipation. When the lung is collapsed, something occurs, more frequently than under other conditions, to affect permeability and to allow accumulation of fluids. Perhaps accumulation of fluid is due rather to lessening of the resorptive powers of the pleura, or to hindrance of normal drainage through a lung in the state of collapse. It is probable that most fluid is removed through the costal pleura rather than through the visceral pleura, but the influence of collapse on its resorptive ability is not known.

The patients' illness started insidiously, or became abrupt and acute following a period of malaise. The

period of malaise varied from a week to three or four months, and was characterized by a sense of unnatural weakness, fatigue, and loss of endurance. Sweating occurred without sufficient cause; soreness in the chest, backache, or other neuromuscular types of pain appeared; nervousness, insomnia, headache, and gastro-intestinal symptoms of mild degree developed. These gastro-intestinal symptoms were chiefly loss of appetite, even amounting to true anorexia with a distaste for food, nausea, or even vomiting, and a progressive loss of weight, strength, and sense of wellbeing. Such symptoms usually caused the patient to seek examination; then a temperature of 100° F. or more, a rapid pulse, and evidence of fluid, were discovered.

After three to six weeks in bed, and usually with removal of serous effusion once or twice, health was regained. Often pleural thickening remained for many weeks after fluid had disappeared and occasionally tuberculosis either in the lungs or elsewhere made its appearance. When the pleural thickening was permanent, that side of the chest became flattened, respiratory excursions were limited, and the mediastinal structures were transposed toward the side affected.

In the majority of instances, healing is so complete that at the close of the year during which observation is available, no clinical or roentgenologic evidence remains to suggest the nature of the sickness.

CLINICAL FINDINGS, COMPLICATIONS AND END RESULTS IN FORTY CASES OF PLEURAL EFFUSION (GROUPS 1 AND 2)

The final diagnosis of the tuberculous character of these cases has been considered reasonably positive because of laboratory evidence, positive either at the onset of the sickness or later in its course, or because of the subsequent evidence of tuberculosis elsewhere in the body. Inoculation of guinea pigs gave positive evidence in thirty cases. In three of these cases chronic tuberculous empyema developed, associated with pyogenic infection, and positive histologic evidence of tuberculosis on examination of tissue obtained at operation. In two cases, tuberculous peritonitis developed. One patient had subsequent tuberculosis in the epididymis, and one, tuberculosis of the spinal column and hip. Bacilli of tuberculosis were found in the sputum of two patients, and two gave roentgenologic evidence of associated pulmonary tuberculosis.

In the group the members of which have been under my observation and care for from two to ten years (group 2), fifteen of the twenty patients were less than forty years of age. Their ages varied from sixteen to forty-six years. In group 1, the ages were somewhat higher, varying from fifteen to sixty-five years. Six patients were more than forty years of age and ten less than thirty years of age. Equal numbers of men and women were affected in both groups.

The symptoms constituting the complaint were essentially the same in the two groups and appeared in the following order: fever, pleural pain, cough, dyspnea, fatigue, weakness and loss of weight. These symptoms occurred with equal frequency and were common to all. Loss of endurance, pains in various parts of the body, especially backache, and nervousness, insomnia, gastro-intestinal distress, chilliness, and sweating, comprised the less frequent symptoms. Many antecedent conditions were diagnosed, including all varieties of infection of the upper part of the respiratory tract. These infections included colds, tonsillitis, bronchitis, influenza, and pneumonia, and were believed to be the cause of the illness at its onset. The discovery of a pleural effusion set in motion the procedures leading to a correct diagnosis.

In group 2 the complications encountered were almost exclusively included in disease of tuberculous character elsewhere in the body. Roentgen rays revealed a pleural lesion in all cases, and this lesion remained in evidence for from six months to four years; the roentgenogram is still positive in two cases because of encapsulated fluid, in one of which the fluid is sterile pus and has been known to be purulent for two years. These two patients, however, are well enough to work. Evidence of adhesions was observed in about 50 per cent of the cases of group 2 and an apical lesion developed in two but failed to produce symptoms of active pulmonary tuberculosis. The roentgenogram finally became negative in more than half of the cases. Tuberculosis of the peritoneum, of the organs of reproduction, and of bone, represented the active lesions developing outside the chest. Those of the bone included tuberculosis of the ribs, of the hip joint, and of the vertebrae. In 25 per cent of the cases of group 2 there were recurrences of pleurisy within the first three or four years, but in only one instance did fluid occur on the opposite side. Usually the recurrences were minor illnessess of brief duration, characterized by pain of pleural type. A characteristic friction rub was heard in one instance.

In the comparable group of twenty cases (group 1) the only significant differences were in the severity and seriousness of the complicating disease.

In two cases active pulmonary tuberculosis developed, sputum was positive, and in one of these death resulted with surprising swiftness. In three patients a more quiescent type of pulmonary tuberculosis developed later, making the incidence of pulmonary tuberculosis 25 per cent. In one case a purulent effusion developed following spontaneous pneumothorax, and in two cases, persistent draining sinuses developed, succeeding surgical procedures carried out elsewhere. Peritonitis, nephrosis, tuberculosis of bone and tuberculosis of glands, completed the list of complicating diseases. All six deaths occurred in group 1.

THE IDENTIFICATION OF TUBERCULOUS FLUIDS

There is nothing at all specific in the physical characteristics of the effusion. It may be serous, serosanguineous, hemorrhagic, or purulent. It usually is serous and looks like clear cider. That which is thin, opalescent, and greenish, is supposed to be most characteristic. If such a fluid is at the same time sterile, the probabilities of its being tuberculous are increased. If bacilli of tuberculosis can be demonstrated on direct smears, the diagnosis is complete. Otherwise, the diagnosis must be deferred until acid-fast organisms have been demonstrated by cultural methods, and have then been proved to be really bacilli of tuberculosis, or until the results of inoculation of guinea pigs can be known.

In not a few instances, it may be necessary to defer the diagnosis indefinitely, awaiting the onset of pulmonary or extrapulmonary tuberculosis to add significance to the opinion regarding the tuberculous nature of the fluid. Osler's findings at necropsy, and his opinion regarding the diagnosis of tuberculosis in all cases of pleurisy with effusion, and the objections of Cabot, Rist and Webb, and of Smith, must be borne in mind when positive laboratory evidence is not obtainable.

In former years, the nature of the cells found in the exudate was believed to be diagnostic of tuberculosis. In 1900, Widal and Revaut published the results of their research, and concluded that a preponderance of lymphocytes indicated tuberculous effusion. They separated tuberculous pleurisy into the primary form, in which there are no demonstrable lesions in the lung, and a secondary form, which results from an underlying tuberculous focus in the lung. They expressed the belief that the lymphocytic reaction applies only to the primary form, that polymorphonuclear cells predominate in the earlier days of the effusion, but that they give way later to the lymphocytic type of cell.

Consideration of the cytologic response of the pleura is included in part I of this report. Theoretically, mononuclear elements should succeed the first polymorphonuclear leukocytosis, and this happens under the conditions of experiment. This sequence is not so dependable in clinical practice. Pinner and Moerke did not believe cytologic studies are at all reliable. It has seemed to me that discovery of a sterile, serous, or seropurulent effusion, containing a high percentage of mononuclear elements, is likely to be diagnostic of tuberculosis. It is not exact evidence.

The question of identification of the tuberculous nature of effusions has engaged the attention of many investigators. Jousset, Zebrowski, Goodall, Damany, Musgrave, Korns, Sears, Hedblom, and Williamson have designed or considered various methods. The final opinion can be obtained only by discovery of the bacillus of tuberculosis directly, by proof of its presence by cultural methods, or by reproduction of typical lesions in guinea pigs inoculated with the pleural fluid.

Magath and Feldman's recent paper contains a full consideration of the question, and they have outlined the methods employed at The Mayo Clinic. These are as follows:

When serous fluid from the chest is referred to the clinical laboratories for examination, it is subjected to three types of examination: first, a direct smear is examined; second, the material is cultured; third, guinea pigs are inoculated.

The following technic is employed:

Variable quantities of fluid are centrifuged for one hour, the exact quantity depending on the amount submitted for examination. It is not unusual to centrifuge as much as a whole liter or even more, to obtain the sediment necessary. Finally, the amount is reduced to one centrifuge tube from which the top 1 c.c. is removed and saved. All the rest of the material in the centrifuge tube is poured out and the sediment alone is saved. From this sediment, numbers of smears are made. As a general principle, the larger the number of smears that is examined, the more likely are bacilli of tuberculosis to be found. The staining is done by the Ziehl-Neelsen method. Ordinarily, if this examination proves the presence of bacilli of tuberculosis, no further procedures are carried out unless especially requested.

When guinea pigs are to be inoculated, the top cubic centimeter that was saved from the centrifuged sample is mixed thoroughly with all of the

remaining sediment, and made up to an amount of 5 c.c. with physiologic sodium chloride solution. Two guinea pigs are given injections with equal amounts of this material, one subcutaneously and one intraperitoneally, and are allowed to live for eight weeks, when they are killed and examined for the presence of miliary tubercles, especially within the spleen.

In making the cultures on Herrold's medium, the sediment is treated with equal parts of 3 per cent hydrochloric acid, to destroy pyogenic and other adventitious organisms, and then is smeared on slant cultures and incubated for variable periods of time. Usually, the culture will develop within three to four weeks. On rare occasions, the cultures will be positive when inoculations of guinea pigs give negative results, and this depends on two factors: first, viable organisms may be present and will grow on the medium but will be of a form that is not pathogenic to guinea pigs; second, occasional failures in inoculations of guinea pigs are inevitable because of the tendency of bacilli of tuberculosis to form clumps. Clumped bacilli may occur in the fluid used for culture and not in that used for inoculation of animals, or the opposite may occur, so that on occasion either test may be positive while the other is negative. It is almost certain that inoculation of guinea pigs will be positive if viable and virulent organisms are introduced. The material injected is always as thoroughly mixed as it is possible to have it, and it is injected out of one syringe; half of the content is given to each pig. Theoretically, tuberculosis should develop in both animals. If living virulent organisms are introduced into each animal, then both will become tuberculous. Practically, that does not always occur. Frequently, when one is negative, the other is positive, because it received that part of the fluid which alone contained viable bacilli. In one of my cases ten animals were given injections, five of which became positive, and five negative. Also, fluid at one aspiration may fail to infect animals but will give positive results at subsequent aspirations. It is presumed that the presence of seven living organisms in the injected material will produce tuberculosis in guinea pigs, and some authors are assured than one single organism, if of virulent nature, will cause development of tuberculosis in a guinea pig. Of course, the amount of material used for sedimentation purposes is extremely important, especially when organisms are few in number. The factor of polymorphic forms that are nonvirulent probably also enters into the question of the variability in positive and negative reports of inoculations of guinea pigs.

The best explanation for failure of tuberculosis to develop in guinea pigs, when injected with material which is known to contain acid-fast bacilli, or which is obtained from lesions known to be tuberculous, may be summarized as follows: (1) scarcity of bacilli; (2) bacilli are dead, avirulent, or of a type that does not easily infect the test animal, and (3) clumping of bacteria may make it possible to have positive results on examination of the direct smear and on culture, but to have inoculation of animals give negative results.

A positive inoculation test is acceptable and may be considered positive evidence of tuberculosis. Under the conditions existing, at The Mayo Clinic, the fear of spontaneous tuberculosis can be dismissed Magath has made as many as 25,000 postmortem examinations of guinea pigs, without finding spontaneous tuberculosis in a single instance. The reliability of the test is evident from his statement regarding necropsy of 15,000 guinea pigs to which he had given injections for diagnostic purposes: "Fifteen per cent have been positive (or 1,200) and after control of the diagnosis by clinicians and surgeons, not a single false positive has been found."

The elapsed time before reports may be made of inoculation tests may be shortened in two ways. Magath and Feldman wrote: "Diagnosis by inoculation is almost as quick as cultures and perhaps more quick when material is microscopically negative. It is possible to diagnose tuberculous lesions in guinea pigs in as short a time as fourteen days after inoculation and almost all guinea pigs that become positive at all will have lesions at the end of thirty days. Five-tenths of a cubic centimeter of old tuberculin injected subcutaneously at the end of four weeks caused no deaths in negative guinea pigs but killed nearly all positive animals within twenty-four hours."

Quick returns may also be had by employing the intra cerebal method of injection, but a high percentage of failures occurs from death of animals. It is not a method that is of value in routine work. Clinicians have not requested the employment of cultural methods with any regularity. The method is employed, however, at the clinic, by Feldman and Magath, in conjunction with inoculation tests and for scientific investigation. Their estimate of the value of the test is fully expressed in their report.

From the clinician's viewpoint, the results of inoculation of animals are still preferred to other

methods of absolute diagnosis. The percentage of positive results on examination of direct smear is small, but when acid-fast organisms are found, evidence is at least acceptable, although not entirely conclusive, of the tuberculous nature of the lesion from which material was obtained. Direct smear has the advantage of speed, and a positive result at once limits the type and extent of surgical procedures. For example, open operation or drainage by means of insertion of tubes is never permissible when direct smear of a purulent exudate that is recovered from an uncontaminated pleural space contains bacilli of tuberculosis, or when the fl[illegible] culturally negative for other organisms after forty-eight hours. It is obvious that, when findings are positive for or highly suggestive of tuberculosis, demonstration of acid-fast organisms in direct smear constitutes sufficient confirmatory evidence. A positive culture may also be considered as confirmatory. If either or both are negative, time must elapse for the development of the disease after inoculation of animals. A positive inoculation test is acceptable without reservation.

One other test should be mentioned, although I have had no experience with it. I refer to the precipitin and complement-fixation reactions with tuberculous exudates. Ogawa concluded: "(1) Of a series of twelve tuberculous pleural exudates, 42 per cent yielded weakly positive precipitin and 92 per cent were definite positive complement-fixation reactions; (2) human pleural exudates and transudates of nontuberculous origin yielded uniformly negative precipitin and tuberculosis complement fixation reactions." He expressed the belief that his results, using fluids from both man and experimental animals, indicated that, in the exudates of tuberculous pleuritis, precipitin, and especially complement-fixing antibodies, are found in large percentage, and that a sensitive complement-fixation test, with special attention to certain technical features, may prove a valuable practical aid to diagnosis.

TREATMENT

The treatment of pleural effusions is not in any sense specific. When the effusion is discovered, there need be little concern about its complete removal. Aspiration may be done at once, and repeated whenever pressure due to fluid causes either distressing dyspnea or cyanosis, or when cardiac action becomes embarrassed. The time that fluid remains free within the chest is of no great concern, nor is it always under control. Courmont and Gardere's work suggests that there is a bactericidal action exerted by the effusion.

Under all circumstances, aspiration may be done as a palliative measure, and it may be repeated as occasion requires, without much fear of changing a serous into a purulent effusion or of producing tuberculous fistulas, although either might occur. At any rate, time is not so urgent as to prevent delay of a few days, during which cultures may be grown and smears studied. If the effusion contains acid-fast bacilli, demonstrable by direct smear, or if it is found sterile for pyogenic organisms, no surgical treatment other than aspiration is permissible, regardless of the physical characteristics of the fluid, whether serous, hemorrhagic, or purulent. The most tragic results I have seen have been set in motion by failure to observe such a rule. It is so axiomatic as to need no repetition, were it not for the fact that victims of procedures aimed at establishment of open drainage, continue to present themselves for whatever treatment is possible or for whatever treatment offers even a small promise of returning them to their former life of usefulness.

After the first aspiration, which provides material for identification, patients are kept continuously in bed until all acute symptoms disappear. No time limit can be stated; the time may be as short as three weeks, or the period in bed may continue for several months. In groups 1 and 2, from four weeks to fourteen weeks in bed was the usual time. With subsidence of fever, disappearance of fluid from the chest, and return to a normal sense of well-being, the subsequent treatment is the same as for other cases of convalescent tuberculosis. Patients are kept under a sanatorium regimen for periods of six months or a year, either at home or in sanatoriums. Often climatic change is urged. If, at the end of the time of probation, examination is satisfactory and there is no evidence of the development of tuberculosis within the lungs or elsewhere, patients are permitted to return to work. Whenever possible, the amount and the hours of work are graduated until work can be done without fatigue.

Results of treatment.—As a result of treatment, twelve patients of group 2 returned to work and have remained well ever since. Some others have not done so well. Five had recurring illnesses of greater or less severity at various times following their recovery from pleurisy with effusion, but finally they became self-supporting. Chronic tuberculosis of one or more organs developed in five

cases, but the patients are able to do a fraction of their usual work. Four have remained sick and are unable to do any work. The twelve who may be considered cured have remained well for periods of from six to ten years. There has not been a single instance of active pulmonary tuberculosis in the whole series of twenty cases of group 2. There have been no fatal cases in this group.

In the comparable series of twenty cases of group 1, less closely under my observation, results were much the same, except that there were six deaths, all occurring within the first year. They were cases of unusual severity. Such cases may occur in any group; the course is rapid, fulminating, and progressive until death occurs. In three of these six cases, active, acute pulmonary tuberculosis developed. Of the other fourteen patients, seven are known to be well and at work.

Gaarde's study of 126 patients of group 3 with pleurisy with effusion, examined at the clinic, was confined to those of idiopathic type, in which there was neither definitely active nor advanced tuberculosis of the lungs. He found that seventy-three patients were cured; eight had residual lesions of the lung or pleura; in ten, evidence of pulmonary tuberculosis developed; and thirty-five died. Of these thirty-five patients, twenty-nine are known to have died of pleurisy, tuberculosis, or some other condition directly traceable to their pleural infection. Eighteen of the thirty-five died within the first year, five within the second year, and four within the third year following the pleural effusion, and eight subsequently. Only seven of the thirty-five who died lived more than five years after the onset of their acute pleurisy. Gaarde expressed the belief that, if a patient survives the original acute attack of pleurisy with effusion, he has a good chance of complete recovery. He found a recovery percentage of 57.9 in 126 cases. His thought was that a patient who survives the first three years, and particularly the first five years, has excellent chances for complete recovery. In evaluating the effect of treatment, he wrote: "From the study of these cases, it is clear idiopathic pleurisy with effusion should be treated as tuberculosis, with a matter of months of rigid regimen, rest, and the methods usually applied in the treatment of tuberculosis." If this is done rather than to allow the patient to return to work when he has recovered from the acute symptoms, the prognosis will be much more favorable. Anderson was also impressed with the improved prognosis of patients who were cared for properly.

When larger groups are studied, the end results are comparable to Gaarde's and to mine. Smears reported the statistics drawn from 439 cases. One hundred nine (25 per cent) of the patients died within seventeen years. Fifty-eight (53 per cent) of the deaths were due to tuberculosis, which is equivalent to 14 per cent of the total number of cases. Approximately 70 per cent of the deaths were within five years, whereas 39 per cent occurred within two years of the time of the effusion.

When advising patients of the diagnosis, of the care, and of the prognosis, of pleurisy with effusion, it is well to stress the importance of the element of time, both of the initial acute illness and of the period of observation. Patients should be advised of Korns' experience with the Chinese patients; namely, that as a rule: "Those who rest most completely and longest have done well, whereas conversely those who have paid little attention to rest are now showing signs of active pulmonary tuberculosis. The conclusion seems justified that serofibrinous pleurisy of obscure origin, after proper means have been used to exclude other causes, should be considered as a manifestation of tuberculosis and should be treated as such."

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DISCUSSION

DR. L. S. PETERS, (Albuquerque, N. M.): I know very little of the experimental side of tuberculous pleurisies with effusion, but think we owe a great deal to Dr. Lemon for the very excellent paper he has given us dealing with this subject. My dealings with tuberculous pleurisy with effusion are confined almost entirely to the clinical end. I was interested in Dr. Lemon's experiments which detailed the introduction of foreign substances into the pleura, producing by their reaction the clinical syndrome of pleurisy with effusion, yet it bears out more or less what we have encountered in pneumothorax work. Those cases which we have followed up with fluoroscopic examination, and have observed over a considerable period of time, usually show an effusion at some time or other. Various etiological factors have been put forward as a reason for the production of this effusion. In his paper Dr. Lemon mentioned that practically all empyemas are tuberculous in origin. I think we see a number of occasional cases in which the empyema may follow lobar pneumonia and not be of the tuberculous type. I have seen a few such cases. The percentage of tuberculous pleurisies with effusion in the hit-and-run cases with tuberculosis, are low. We see only a small percentage of our tuberculous patients, who, while under the course of treatment, develop tuberculous effusion. Dr. Lemon mentioned cases of doubling, in which it has occurred on the opposite side. During the course of my pneumothorax work, I have had a case of double effusion at the same time—in other words effusion on the pneumothoric side and then on the parallel arterial member. There have been only nine or ten such cases of idiopathic pleurisies, showing pleurisy on one side, then being well for a number of years and then developing effusion on the opposite side. In regard to treatment of these tuberculous plurisies with effusion, it can be summed up very well by saying, the less we do the better off they are. The average patient with pleurisy with effusion usually gets along all right with uneventful recovery in a reasonable length of time. Unless it is necessary to relieve pressure symptoms, I do not consider it wise to aspirate, as repeated aspiration to keep fluid down is more or less dangerous, and I am one of the old-fashioned kind who believes that effusion tends to restrict tuberculous invasion and many times lungs are saved merely by the fact that they have been kept more or less at rest by virtue of the effusion being present.

DR. R. O. BROWN (Santa Fe): I have enjoyed Dr. Lemon's paper thoroughly. One of the things that struck me particularly was the fact that the reaction which occurs when a nonspecific substance is injected into the lungs or pleural cavity, is essentially the same as that with a specific organism, such as tubercle bacilli or a live organism; thus, we find the processes are really less complicated and that they obey a general law rather than a specific one. In the diagnosis of pleural effusion, which, we all know may be mistaken for influenza-pneumonia, it occurs to me to wonder if we are safe in saying that something that preceded the condition might not be responsible for it; for instance, a localized pneumonia might have broken down some tubercles; with influenza or severe bronchitis, I believe we always have some pneumonia. Whether these preceding diagnoses that were made were not, after all, correct and that pleurisy with effusion (perhaps tuberculous) was not a complication rather than the cause of the disease, is a matter of conjecture. It is also interesting to note that Dr. Lemon has reported in a series of 123 patients, Group 3, with pleurisy with effusion, confined to those of the idiopathic type, seventy-three patients were cured, eight had residual lesions of the lung or pleura, in ten evidence of pulmonary tuberculosis developed, and thirty-five died. Eighteen of the thirty-five died within the first year; five within the second year; four within the third year following the pleural effusion, and eight subsequently. Only seven of the thirty-five who died lived more than five years after the onset of their acute pleurisy. I wonder if there might not be a maximum of immunity which we may not develop to repeated infection of tuberculosis, and, if we have had tuberculosis and gotten,

say, over fifteen years of life with it, if we do not have a pretty good chance of complete recovery. I had an opportunity recently to talk to a man interested in tuberculosis work in the clinics in Chicago. These have a very large endowment and have funds with which to take x-ray pictures whenever desired. He stated that it was very interesting to be able to do this and it had proved to him that he could get a shadow on the x-ray plate, appearing in the course of a week, and that in the course of a few weeks this shadow would disappear. I enjoyed Dr. Lemon's paper very much.

DR. FRANK E. MERA, (Santa Fe, N. M.): It is very true that we now rarely get pleurisy with effusion; years ago they were very common, but that was before the idea of rest had permeated throughout the profession. I believe that rest is very important in the early treatment of pneumothorax cases. By this means, I believe we escape quite a few of these bothersome cases. As to the treatment of effusion, I believe, if I have erred, I have erred in waiting too long to aspirate on account of the danger of secondary infection, as sometimes we get adhesions we might not otherwise have, thus spoiling the case as far as pneumothorax is concerned.

DR. LEMON (closing): It would be confusing rather than helpful for me to attempt to consider all the various problems that arise in a case in which there is tuberculous pleural effusion. It is proper, however, to express an opinion regarding removal of fluid. From the cases studied, it is evident that serious injury can be done by hasty or ill-considered operation, or by the use of open drainage, if patients have either a serous or purulent effusion which, on culture, does not yield pyogenic organisms. No method of open drainage should be used for sterile fluids, regardless of their appearance, and no harm will be done if interference is delayed until the results of a culture can be obtained.

From the standpoint of treatment, it is essential that all cases in which fluids are such as have just been described, should be considered tuberculous, and I have felt that there were five working rules that might be used as indications for removal of fluid:

1. Fluid may be removed by needle, for laboratory examinations, such as cultures for pyogenic organisms and organisms of tuberculosis, and for inoculation of animals by the methods that have been considered in the paper.

2. If symptoms of pressure are present, producing respiratory or circulatory embarrassment, fluid should be removed. The symptoms usually are dyspnea, cyanosis, or tachycardia.

3. When the chest contains so much fluid that it has caused mediastinal displacement, a sufficient amount may be removed to restore the mediastinum approximately to its normal situation.

4. Pleural effusion that fails to be absorbed after an interval of time that would seem to be adequate for its absorption, may be withdrawn with justification.

5. When the fluid is situated bilaterally, it should be removed.

Occasionally, it is necessary to remove fluid more than once. Rarely, fluid needs to be removed on a large number of occasions. The indications, however, are the same in every instance.

I have had no experience with removal of fluid and replacement with oxygen or air. There are theoretical grounds for believing that such a procedure might be of value, but my patients have responded satisfactorily to removal of the fluid only. Clinical experience, also, has shown that whereas aspirating a large amount of fluid seems to stimulate further exudation, aspirating a relatively small amount results in an augmented rate of spontaneous absorption.

It is my experience that 5 to 20 per cent of patients who come with draining sinuses apparently resulting from simple, chronic empyema, are, in reality, suffering from tuberculous empyema. Obviously, these pleural cavities are infected with various types of organisms, and even though tuberculosis may be shown to be present, yet the patients must be treated as are others with chronic empyema. The results of treatment, however, are not as satisfactory as in nontuberculous cases; only a limited number of patients recover without a persistently draining sinus.

WHAT AN ORGANIZED GROUP CAN DO TOWARD FORWARDING CLINICAL RESEARCH AND TREATMENT OF CANCER

Reviewing 436 cases of cancer analyzing a few of our clinical problems in diagnosis and treatment.

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(Read before the Forty-First Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932.)

As early as 50 B. C. surgical treatment of cancer has been the method of choice. Since that time and up to now, no cure has been found. Those who have had much expereince in the diagnosis and treatment of cancer nourish a hope that some day a prevention or cure for this destructive disease will be discovered. The failure through all these years on the part of medical investigators to produce a cure, has stimulated the activities of the quack and made the public easy prey. The cancer patient willingly will accept the faintest ray of hope, no matter by whom it may be offered or the form in which it is applied. Our daily press and magazines are full of new dis-

coveries for the cure of cancer, exploiting every day a new discovery of its cause or cure, all of which have been cast into the discard after a scientific and searching application as to value has been made. This seemingly hopeless condition has created many pessimists among us, and it behooves each and every one of us to keep an open mind on all new and suggested theories, for many useful and accepted inventions have come to us by chance, and through this means some form of treatment or prevention will certainly be discovered.

Summing up briefly the chronological development in the treatment of cancer to the present day, we find in the early history of medicine the eras of witchcraft and crude chemistry, followed by the period of all manner of agents—vegetable, mineral, gaseous, and mechanical, such as the twisting of a wire around the base of the growth. Then there was the period of the escharotic pastes, which have long had their advocates even in this day. Some of the well-known pastes, such as the Vienna paste, are still in use. In this country the Indian medicine man has played a part in the treatment of cancer, with his herb and whiskey recipe. The eighteenth century brought us the period of electricity, with its coils and various appliances, which the quack immediately seized upon as a new and lucrative means of foisting his sure cure upon the gullible public. Even to this day, many lesions are still being treated with the much-abused violet ray. In 1898 the discovery of radium by Professor and Madame Curie, and the immediate use by the quacks of this new mineral in all sorts of pastes and oils and drinking water, received such widespread publicity that its use by the profession fell rapidly into disrepute so that for several years its employment in the field of scientific medicine was delayed. In recent years there have been many ardent students confident in the belief that a germ or parasite was the specific cause for malignant tumor growths, and specific serums have been produced for injection into the patient, but nothing of value has come of it, only one more new hope. And last, but not least, has come the advent of endocrine and glandular therapy in its various forms and combinations, extensively used in this country and abroad, but it has failed to be accepted as a cure. And so, through two thousand years down to the present time, no treatment has proved of value except surgery, x-ray, and radium.

In the last decade, world-wide attention has been given to the study of cancer, both experimentally and clinically, and each year we have seen great advances for more accurate diagnosis and treatment. Much of the success in the present-day knowledge of diagnosis and treatment of cancer is due to organized groups who have been intelligently interested and who have had made possible for them, through large amounts of clinical material and scientific equipment, the opportunity for research. But this knowledge, unfortunately, has been limited to a very small number of groups throughout the world. According to the American Society for the Control of Cancer, four cases of cancer a year are seen by the average physician. Multiplying this by a lifetime of clinical pracntice, very few have felt qualified adequately to diagnose and treat cancer with the present-day knowledge of the subject. Under the leadership of this society and the American College of Surgeons, group clinics have been formed throughout the United States and Canada for a two-fold purpose: first, of studying more thoroughly the clinical and therapeutic problems confronting the medical profession today; second, of affording the opportunity to a greater number of men to become skilled in better diagnosis and treatment, with the hope that, by the correlation of records from this large amount of clinical material with details of treatment and end results, facts of great importance will be contributed concerning heredity, cause, prevention, and, eventually, the cure.

Professor Roussy, head of the Institute of Cancer in Paris, before the International Congress of Radiologists last year in Paris, said, "It is better to have the work of cancer research in many hands in all parts of the world than in isolated groups, for no one knows who will find the cause, or various causes, and it will give all a small part of the credit in the final analysis and solution." Already we have knowledge that different races in various parts of the world are more susceptible than others to malignant tumor growths in certain anatomical locations of the body. If we accept the theory of irritation, we can explain quite readily why the incidence of buccal cancer in the betelnut chewers of the Phillipines and Ceylon among females ranges from 13 to 25 per cent, while among the American women who chew non-irritating gums, it is only 1 per cent. But we can't answer the question of why in these same groups both death rates of cancer of the stomach are the same, or 25 per cent. No disease is so widespread as cancer. It is observed in all races of people and occurs throughout the animal kingdom. Primitive peoples removed from civilization suffer to a lesser extent than the white races, which is true even in our own country among the negroes and Indians. These statistics, however, may be explained on the basis of

inadequate medical observation and proper diagnostic facilities in the more remote districts. Customs of eating and drinking and cleanliness, occupational irritations, and the various tropical and chronic diseases, play a part in the research problem. Even the automobile, with its exhaust of carbon monoxide, is being seriously condemned, along with the after effects of influenza, in the rapidly increasing number of bronchial carcinomata. In Vienna, at the Pathological Institute of the University, there were forty-seven cases out of three thousand autopsies in 1930. In 1931, while I was there, more than fifty cases had been recognized during the first six months, with the possibility that this would double during the twelve months.

In this present era of clinical and experimental research, the clinician is confronted with a very complex problem of separating the clinically benign from the clinically malignant. These patients are coming to the physician very much earlier than in the days gone by, and present an entirely different clinical history and picture. Likewise, the surgeon, if called upon to operate, may be removing a tumor tissue that he is much in doubt about from its gross pathological appearance; and he seeks in the emergency of the moment the assistance and advice of the pathologist, who, after making a hurried frozen section, may be still more in doubt. After a hurried consultation in the operating room, it is decided by the old adage, "When in doubt, operate." And so, many times sacrificing surgical procedures are carried out unnecessarily. This, of course, is regrettable from the patient's standpoint and adds to the records one more case as cured, when, instead, it should have been listed as an undetermined, or a borderline, case. Bloodgood has shown quite recently, in a large series of cases of breast tumor that were studied carefully ten years ago by very able pathologists and were diagnosed either as malignant or suspicious, that these same specimens, reviewed on account of the excellent percentage of permanent cures in this group recorded by follow-up, were pronounced benign in nearly 100 per cent. The experienced pathologist has given us much information in recent years concerning the different degrees of malignancy, its relative sensitivity to radium and x-ray, and its ability to metastasize or not to metastasize. With this information the clinician has been better able to prognose the outcome of his patient's ailment; the radiologist understands better the type of tumor cell which requires a definite penetration to destroy its growth; and the surgeon has learned in which cases to do his most radical surgery.

During the past three years, since the organization of a cancer board in San Diego, we have had the opportunity to see 436 cases of malignant tumor growths, involving every organ and tissue of the body either primarily or secondarily. Our group was organized under the plan of the American College of Surgeons and in connection with the General Hospital, which provided 50 mgms. of radium, a 200,000 v. deep therapy equipment, pathological department, radiologist, a recording secretary, and social service worker. Weekly conferences were held on all cases presenting themselves at the clinic and those that were in the hospital for diagnosis and treatment. There was also a follow-up of those who had received treatment. Our efforts have been directed entirely toward clinical research and the results of our treatment. As yet we have been unable to engage in experimental research to any great extent, due to the lack of special equipment and a highly trained staff of research workers to carry on this phase of the work. Individual members of this group, representing each department of medicine and surgery and the specialties, have expressed themselves as having profited much by the group study of the cases, and the patients have been benefited by the combined judgment made possible through greater experience.

The results of our first year's experience were rather disappointing. One hundred and eighteen cases were admitted for treatment or palliative care, the results of which were fifty-seven deaths, or nearly 50 per cent, with twenty-eight improved, or 25 per cent, and thirty-three unimproved, or 28 per cent. Analyzing some of the reasons for such a high mortality rate, we discovered that every one of these cases was far advanced, having sought medical aid too late. Many had fallen into the hands of the cultists, coming for medical care as a last resort, while others had received symptomatic care from their family physicians, who either did not have the knowledge of diagnosis and treatment of cancer or had drifted into the belief that there is nothing to be done but to await the inevitable end.

The second and third years brought before our group 318 cases for diagnosis and treatment. The average age was 62 years, ranging from 19 to 84. There were 152 males and 166 females. Surgical treatment was given to 123, or 39 per cent as the major treatment, while seventy-two or 22 per cent, received radium or deep therapy or the combination of the two, as the major treatment. Seventy-five or 23 per cent, were improved; thirty-two, or 10 per cent, unimproved; 124, or 39 per cent expired.

There were sixty-eight autopsies, or 22 per cent; 231 proved malignancies, or 73 per cent; fifty-four proved not malignant, or 17 per cent; and twenty-three cases, or 7 per cent, were undertermined due to various reasons, such as refusals for biopsies, or through fear, not entering the hospital for further diagnosis. Comparing the analysis of the first group of 118 cases with the second group of 318 cases, we note that, instead of a mortality rate of 50 per cent, as we had the first year, it fell to 39 per cent for the next two years. Also it shows that 17 per cent of the cases presenting themselves for diagnosis were proved not malignant, and 7 per cent undertermined, as against none in the first group. We explain the improvement in our results on two theories: For the first year the machinery of our group was just beginning to function; second, by the publicity of such an organized group, more patients sought advice and treatment earlier, which was a distinct advantage both to the doctor and patient. We have not referred to the word "cured" in our statistics, but prefer to ust "improved" instead, because we have not had the opportunity to observe these cases that are living and well over the required five-year period of observation.

Biopsies are performed on all cases preoperatively or at the time of exploration, for the twofold purpose of obtaining a better working knowledge of the type of malignancy being treated, and a more accurate compilation of proved cases. Proved diagnosis in cancer research is as much to be desired as in any other branch of the practice of medicine or surgery. Without positive pathological proof before beginning treatment, the records of such work are unreliable and do not aid a program of clinical research. On the other hand, a negative pathological report must not always be construed as a positive finding against malignancy. Many times it is necessary to remove numerous sections, and the pathologist may find it necessary to make serial sections of such a piece of tissue. As an illustration, a female patient, age 28, complained of bleeding from the rectum for two months. Physical examination showed an ulcerated area about the size of a nickel, on the posterior wall, 3 inches from the anal margin. A biopsy was taken at this time, which was reported benign, and the ulcer was cauterized. About two months later, a second biopsy was done, which was reported as benign, with a second cauterization. Following the second cauterization, five radium applications were made, the attending surgeon and radiologist applying their treatment without positive proof of a malignant ulceration, relying entirely upon clinical findings. During the interval following these treatments and her appearance before our Board in 1929, the patient had complained of a sense of pressure in the rectum, with considerable mucus, a bloody discharge, and almost a complete obstruction. An emergency colostomy was performed without any attempt to explore the tumor mass in the rectum or remove it. At this time a third biopsy was obtained and reported benign. During the five years, from the onset of this patient's symptoms followed with cauterization and five radium applications and an emergency colostomy, she was believed to be clinically a case of cancer of the rectum. At autopsy performed on Feb. 10, 1932, there was no evidence of malignancy in the rectum or metastatic involvement throughout the organs of the body. The pathologist's report and final diagnosis was "chronic proctitis of mycotic origin and lymphadenitis of the celiac axis lymph nodes of the same type". My purpose in bringing this case to your attention is to show what great harm can result from a careless unproved diagnosis and the indiscriminate use of radium and cauterization.

As a member of the surgical division of this group, I have been convinced that, on too many occasions, cases are pronounced "inoperable" and returned from the operating room with nothing done but an exploration, with the assurance to the family that nothing more could be done. I am unable to determine whether this too-frequent occurrence is due to the surgeon's desire to maintain a low percentage in his death rate or to a lack of courage and skill. Many happy results, both for the doctor and patient, have been my experiences in just such cases. I believe in the removal of any tumor mass that is anatomically removable. We mean by this, of course, where there is not metastasis to vital organs. Age does not prohibit such a procedure, nor does the condition of the patient inhibit such a surgical undertaking. Two-stages, or even three-stage, procedures may be required, according to the judgment of the operator. As an illustration, a woman, age 35, had complained of abdominal pain for two years. She had lost 40 pounds in weight. During an attack of abdominal pain, she discovered a tumor mass in the upper abdomen. Her family physician's diagnosis was either a tumor or an obstruction. X-ray examination revealed a filling defect of the transverse colon, and the greater curvature of the stomach. Stool examinations showed large quantities of occult blood. An exploratory operation revealed a large inflammatory

mass involving the great omentum, the transverse colon, and the anterior wall of the stomach. On first observation, the removal seemed impossible, and several of my colleagues in the operating room at the time advised that the best thing to do was to close the abdomen and send the patient back to her bed. In attempting to mobilize this mass, the posterior wall of the transverse colon was ruptured, and it seemed like a hopeless undertaking. The entire mass, through which ran the transverse colon with the great omentum, was mobilized outside the abdomen and resected, leaving a two-barrel colostomy, as done in the Mikulicz first-stage procedure. This patient made an uneventful recovery from her first stage operation, and six weeks later the double-barreled colostomy was closed extraperitoneally. It has now been two and one-half years since her operation. She has regained her normal weight of 185 pounds, and feels perfectly well. The pathological report was "adeno-carcinoma of the colon". It has now been four and one-half years since the onset of this patient's first symptoms. We feel quite certain that, if our surgical removal of this tumor mass had not been done, this patient would not be living and well today. I am sure that many of you have had similar experiences.

I am confident that, since the organization of such a group in our community, we have accomplished a great deal of good for this type of patient. We have enlisted the confidence of the people to seek the advice and counsel of the profession instead of the quack. As individuals, we have profited in experience and have learned many ways in which we can offer assistance to these unfortunate sufferers, who in the past have been badly neglected. Many months, and even years, of usefulness and comfort have been added to the lives of a great number of these patients. From a social and economic standpoint, long periods of hospitalization and invalidism can be avoided, provided proper treatment has been instituted by experienced men, thus relieving a great burden upon our tax-supported institutions, for many of these neglected cases become indigent.

With such a record of service as a weapon in the hands of qualified men in a community, it is easier to obtain support from public officials in supplying the means of equipment and apparatus. And last, but not least, you will be making a great contribution to posterity, no matter how small your individual part may be, that will aid the next generation or two in finally solving one of our most complex medical problems.

PUBLIC HEALTH NOTES

J. ROSSLYN EARP, DR. P. H.
Director New Mexico State Bureau of Public Health

OPHTHALMIA NEONATORUM

A report from the schools for blind children, of the London County Council, shows that last year 20 per cent of the blindness among the pupils was due to ophthalmia neonatorum. In New Mexico, this condition is responsible for just double that proportion (40 per cent) of the blind children in the School for the Blind at Alamogordo. In London, they can boast that, while the reported cases of ophthalmia neonatorum have not decreased in the last fifteen years, the amount of blindness resulting from these cases has been cut in half.

The Lancet[1] infers that the larger proportion of cures is due to more efficient care and adds, "By far the most important part of treatment consists in frequent irrigation of the eyes during the acute stage, the frequency being based upon the amount of discharge". Such treatment almost implies hospital care. At least mother and baby must be within easy access of expert medical aid. How much more difficult to secure these conditions in New Mexico than in London! We must be the more vigilant in seeing that adequate prophylaxis shall prevent the necessity of treatment. A copy of the Regulations governing the prevention of infant blindness is available to any physician, upon request.

COLLAPSE THERAPY IN TUBERCULOSIS

The modern development of collapse therapy must be one of the factors influencing the downward trend of mortality from tuberculosis. How important this method of treatment has become from the clinical point of view, is shown in a recent article of Hawes and Stone[2] who survey present practice in various parts of the country. In Saranac Lake, 40 to 50 per cent of patients; in Detroit, 57 per cent, are receiving some form of operative collapse treatment.

The probable good effects of this tendency, not only directly upon tuberculosis mortality, but also upon the incidence of fresh cases, has been very clearly foreseen and forecast by Hruby[3]. In a series of 1,600 cases of open tuberculosis, collected from the literature, Hruby finds that, after "phrenicectomy," 51.5 per cent became sputum negative; after pneumothorax, 48 per cent. The use of collapse therapy on a large scale means, therefore, that a large proportion, roughly a quarter, of all cases of open tuberculosis will become closed cases. This

must have a significant effect upon the spread of infection.

Moreover, Hruby insists that collapse therapy with adequate follow-up care in the home, is a satisfactory substitute for prolonged care in a sanatorium and is much more economical. This aspect of his argument is of particular interest in New Mexico, which has no sanatorium for indigent cases. If health officers can secure the help of physicians skilled in thoracic surgery to institute collapse in suitable indigent cases, they should be willing to set aside some of the time of the county public health nurse for follow-up care.

POSTVACCINATION ENCEPHALITIS

In a recent issue of Public Health Reports', Surgeon Charles Armstrong offers some suggestions for this rare complication of vaccination. There have been seventy-one American cases since the disease was first reported in 1924. These have followed the use of calf virus from ten, out of a total of twelve, vaccine establishments. The American fatality rate is 37 per cent, as against a European rate of 42.

While the etiology of this condition remains obscure, attempts at prevention must be more or less empirical. Doctor Armstrong offers the following suggesions.

The vaccination technic should employ a small superficial insertion, never over one-eighth inch in its greatest diameter, and should employ no routine dressing. Infancy is the best time for performing the primary vaccination.

Evidence is presented which suggests that inoculation with diphtheria toxoid tends to render mice somewhat more resistant to vaccine virus subsequently administered intracerebrally. On the strength of these experiments and of certain considerations of our knowledge of nonspecific immunity, the following routine is recommended:

The first dose of diphtheria toxoid is to be given at six months of age, and the second dose one month later; vaccination against smallpox is to follow the second inoculation in from three to four weeks.

While one may not have too much confidence that this procedure will certainly avert the occasional occurrence of vaccination encephalitis, it has no drawbacks and seems to deserve a trial.

REFERENCES

1. Editorial, The Lancet, June 18, 1932. p 1314.
2. Hawes, J. B., II; and Stone, M. J.: Collapse therapy of pulmonary tuberculosis in the New England states. J. A. M. A. 98:2048 (Jne 11) 1932.
3. Hruby, A. J.: The public health aspect of collapse therapy. Tubercle, 13:401 (June) 1932.
4. Armstrong, C.: Postvaccination encephalitis with special reference to prevention. Public Health Reports, 47:1553, (July 22) 1932.

CASE REPORT

FELIX P. MILLER, M. D.
El Paso, Texas

(Read before El Paso County Medical Society, April 25, 1932).

The patient, a young lady about twenty-four years of age, had been suffering with severe attacks of abdominal pain, often attended with nausea and vomiting. She had previously had surgical intervention for a suppurative appendix, when she states, the drain was removed on the second day. Frequently the attacks were so severe that she would have to leave her work because of the cramps and severe pain. Most of the attacks were attended with nausea, and several had been accompanied by both nausea and vomtiing. On one occasion there had been a rise of temperature, but always attacks were accompanied by an increased pulse rate.

Gastro-intestinal studies by the roentgen ray, with barium meal and barium enemata, indicated a partial obstruction at the junction of the ileum and the cecum. Her last attack was attended with definite symptoms of obstruction.

At operation, under spinal anesthesia, we found an obstruction near the hepatic flexure of the ascending colon. The ascending colon was markedly distended. We found a congenital band beginning above the hepatic flexure, crossing the colon at the hepatic flexure. At its origin, it was slightly fan-shaped, extending down and across the colon, having its attachment to the mesentery near the ileocecal junction. When this band was picked up between the fingers, it presented a ribbon-like appearance. When released, it at once pressed upon the colon, causing the obstruction. This band was removed by dissection with scissors, beginning at its lower extremity and cutting it free along its attachment to the colon, to its origin above the hepatic flexure. The colon at once resumed its normal shape.

Complete relief has been afforded by the simple removal of this congenital band.

MEETING OF PACIFIC ASSOCIATION OF RAILWAY SURGEONS.

EL PASO, OCTOBER 7 AND 8.

Final announcement is made of the meeting of the Pacific Association of Railway Surgeons, to be held on October 7 and 8, in El Paso. A dinner for members of the Association and visiting doctors and their wives will be held on the night of October 7th. A dinner for members of the Association will be held on the night of October 8th. Plans for

visiting points of interest in El Paso, and her neighboring city, Juarez, Old Mexico, have been made. Ample facilities for golf are available. A trip to Carlsbad Caverns has been arranged for October 8th. Members so desiring may take the trip to Mexico City leaving El Paso on October 10th. Officers of the Association are: President, Dr. Giles S. Hall, Los Angeles, Secretary, Dr. W. T. Cummins, San Francisco. Chairman of Program Committee, Dr. Philips Stephens. Local arrangements are being made by a committee of which Dr. R. L. Ramey is chairman. Other members of the committee are Drs. J. M. Britton, B. H. Britton, W. L. Brown, J. J. Gorman, J B. Gray, R. H. Homan, S. F. King, T. J. McCamant, F P. Miller, J. A. Pickett, E. W. Rheinheimer, F. P. Schuster, S. A. Schuster, H. H. Varner, W. W. Waite, H. E. Stevenson.

Members of The Women's Auxiliary to the El Paso County Medical Society are making plans for entertainment of the wives who are in attendance.

PROGRAM

Friday, October 7, 9:00 a. m.

1. Opening address.
2. President's Address.
3. Round Table: Diagnosis and Procedure in Handling Luetics among Railway Employes.
   a. The Special Senses: Eye, Ear, Nose, Throat.
   Dr. P. H. Goldberg, Los Angeles.
   b. Cardio-Vascular: Dr. S. C. Davis, Tucson.
   c. Psychoneurological. Dr. Mott Arnold, San Diego.

(Speakers allowed 15 minutes each.)
30 minutes discussion.

Saturday, October 8, 9:00 a. m.

1. Urinary Calculi in a Railway Hospital.
   Dr. Burnet Wright, Los Angeles.
2. Methods of Treatment which Have Proven Successful in Fractures of the Major Extremities—(with latern slides.)
   Dr. Paul B. Magnuson, Chicago, Ill.
   (by invitation)

Discussion opened Dr. Alfred Gallant, Los Angeles.
(by invitation)

3. Election of officers for the coming year.

THE NEW MEXICO MEDICAL SOCIETY

SEMI-CENTENNIAL SESSION

Santa Fe, New Mexico
May 19-21, 1932

May 19, 1932

The Semi-Centennial Session of the New Mexico Medical Society convened at Santa Fe, N. M., where registration headquarters had been established in the La Fonda Hotel, most of the business and scientific sessions being held in the Lecture Room of that institution.

MEETING OF THE COUNCIL

Called to order by the President, Dr. M. K. Wylder (Albuquerque) at 9 a. m., there were present: Ex-officio members, Drs. M. K. Wylder and L. B. Cohenour (Albuquerque); members, Dr. R. O. Brown (Santa Fe) and President-Elect F. D. Vickers (Deming).

Financial report of the Treasurer, Dr. L. B. Cohenour (Albuquerque) was read by him as follows:

Balance on hand at annual report May 20, 1931	$1,596.99
Delinquent dues collected from 15 members	75.00
Dues from new members—None.	
Annual dues for 1932 from 196 members	980.00
Total cash received to May 19, 1932	$2,651.99

Disbursements

Southwestern Medicine for 228 members for 1931	$ 456.00
Treasurer's Bond for 1931-1932	5.00
R. O. Brown, May 22, 1931—Medical Legislation	59.80
W. T. Joyner, May 22, 1931—Medical Legislation	30.00
H. A. Ingalls, May 22, 1931—Medical Legislation	30.00
Reporter for 1931 meeting (Balance half fee)	100.00
Secretary's Salary for 1931-32	300.00
American Medical Association—Directory	12.00
Gordon-Horton Printing Co.—500 letter heads	5.75
Gordon-Horton Printing Co.—250 stamped envelopes	7.50
Gordon-Horton Printing Co.—100 application blanks	4.50
Gordon-Horton Printing Co.—250 stamped envelopes	7.50
Gordon-Horton Printing Co.—100 letter heads	3.50
Reporter for 1932 meeting (advance half fee)	100.00
Gordon-Horton Printing Co.—500 membership cards	4.75
Total expenditures to May 19, 1932	$1,126.30
Total Balance on hand May 19, 1932	$1,525.69

Outstanding Indebtedness

Southwestern Medicine for 196 members for 1932	$ 392.00
Secretary's salary for 1932-1933	300.00
Reporter for 1932 meeting (balance of fee)	100.00
Treasurer's bond for 1932-1933	5.00
Approximate total of indebtedness	797.00
Expected balance after all bills are paid	728.69

Respectfully submitted,
(Signed) L. B. COHENOUR,
Sec'y.-Treas.

Motion that the Treasurer's Report be accepted and approved as read was made by Dr. R. O. Brown

(Santa Fe), seconded by Dr. F. D. Vickers (Deming), and carried.

No further business arising, adjournment followed at 10 a. m.

GENERAL SESSION

The meeting was formally opened at 10 a. m., when the President, Dr. M. K. Wylder (Albuquerque), announced that "The Fiftieth Session of the New Mexico Medical Society is called to order, and address of welcome will be made by Honorable Arthur Seligman, Governor of New Mexico."

In his address, Governor Seligman stated that he welcomed the physicians to the ancient and historic capital city of the State, with mingled feelings of pride, humiliation and gratitude—with pride because of what has been achieved by the profession in the fifty years since the Society's organization. He recalled that it was within his own lifetime that the railroad had come into New Mexico, bringing the advance guard of practitioners; that before that time the people of wealth in the State who suffered from chronic ills would, as a rule, travel to St. Louis in the stage coach, in order to obtain diagnosis and treatment for their condition while in the isolated settlements, itinerate quacks, old women and medicine men, and much too often the so-called witch doctors, would hold sway. "There were no hospital facilities then and none of the fine clinics we have today which are at the service of everyone. Yet marvelous cures were credited to your profession in those days of heroic surgery with none of the modern facilities to aid. The few practising physicians gave of their strength freely; they were often compelled to travel many miles on horseback and foot, in all kinds of weather and under all conditions. You can understand, therefore, my pride when I point to the self-sacrifice of your profession and the marvelous strides forward which have been made since the organization of your Society. It is for these reasons, too, that a sense of deep humiliation and gratitude overwhelms me." The Governor also commented on the increase in the number of medical practitioners in New Mexico and referred to the opportunities for the physician in the large isolated areas where numerous settlements still depend on primitive home remedies and unskilled practitioners without training or licenses. In closing, a tribute was paid to the physician as the healing angel and to the profession, in that no other field of science has shown such great progress as medicine in the past fifty years.

Honorable David Chavez, Mayor of the City of Santa Fe, also expressed his pleasure at welcoming the members of the Society and hoped all would have ample time to visit some of the many places of historic interest in and around the city. "We want you to feel," he stated, "that we want to do everything that we can to make your visit pleasant. We want to be hospitable in every way that we can, and I am sure that the members of the profession who belong to this Society from Santa Fe will see that you are royally treated. It seems to me it was more or less appropriate that you selected this beautiful city of Santa Fe as the place of your fiftieth convention. One cannot help but think of the sacrifices and benefits your profession is bringing to mankind and compare them, to a certain extent, to the history and the sacrifices which were made by those pioneers who many years ago came to this soil and brought civilization to the Southwest and to America. I know that many of you will be interested in the early history of Santa Fe and I urge upon the members of the profession from Santa Fe to acquaint their brother members of the Society with some of the relics and history that we have here in order that, at some later date, some of these members may have a little time to come back and see us again in Santa Fe and visit our places of interest and enjoy the scenic rides and atmosphere of this ancient city. As a common ordinary layman and without attempt to infringe upon the scientific part of your program, which, I understand, begins this afternoon, it might not be inappropriate to say that even we laymen appreciate what your Society is doing for humanity. Even within the memory of many of those present, infant mortality was very high here in New Mexico. Now, the child's chance for life is fully twice as good as it was fifty years ago. Added to this, you have almost abolished yellow fever, greatly reduced the death rates from malaria, tuberculosis, and other diseases, and the average span of life has been lengthened from 40 years, in 1830, to 60 years, in 1930; and we can understand that, if the cause of cancer can be discovered, the average of man's life in 1950 may be as high as 70 years. We say this, gentlemen of the New Mexico medical profession, to have you understand that, as a whole, the average man realizes and appreciates the service that you are rendering to humanity. Many times, many of you probably feel that people are ungrateful, that you are very poorly paid and that you cannot collect your fees, but I believe that you cannot help but feel proud when you realize that those people whom you are assisting, whom you are helping to recover health, really appreciate the services you are rendering. I want to say again, Mr. President and distinguished members of your profession, that you are heartily welcome to the city of Santa Fe and we trust your deliberations will be successful, that you will continde to serve during the next fifty years as well as you have during the past fifty, and that you will continue to serve during the next fifty this State to the end that, within the next fifty years, we shall have made the same progress that you have made during the last fifty. Thank you."

In response, Dr. M. K. Wylder (Albuquerque) replied: "I first want to say that I, personally, and I think every member of the Society here, as well as the visitors, owe a vote of thanks to the Governor and to the Mayor for the encouraging words and hearty welcome they have given us. Their addresses of welcome on account of the Fiftieth Anniversary are a little out of the ordinary and are certainly inspiring and encouraging to all of us. I have attended a great many medical meetings and there are a great many things we all do the same way. No med-

ical meeting is ever opened and gets under way without addresses of welcome from representative citizens of the community, who give us the glad hand and tell how happy they are to have us with them. I particularly remember one meeting I attended in Cleveland, Ohio, a few years ago, where the Chief of Police was among those who welcomed us. Among other things he told us to be sure and wear our badges, and that every man wearing a badge would be safe at any hour of the day or night and would be seen to his hotel without question. I feel we will be protected here in Santa Fe if we wear our badges. We are certainly glad to come to Santa Fe; we always have a good time here and appreciate the spirit of good fellowship extended. This being the Fiftieth Anniversary of our Society, it is well that we look back and consider that in 1882, fifty years ago, a few men got together and organized the New Mexico Medical Society, realizing at that early date the advantage and benefit of getting together and exchanging views and ideas, reading papers, and perhaps, in those days, taking a drink together. As we consider the hardships those men endured fifty years ago, when there was only one railroad through New Mexico and only one train a week ran over it, as we realize the difficulties they endured to get together and organize this Society and how, despite every obstacle, they did marvelous work, as Governor Seligman has so ably told us, in building up the commonwealth, let us strive to keep up the high standard which these pioneers set, so that in 1982, when the first century of this Society's existence is passed, those in attendance can report all along the line that the men of the Society in 1932 kept up the same high ideals attained by those original organizers. If we can do this, we can feel we have not lived in vain. I now take great pleasure in introducing the new President of the Society, Dr. F. D. Vickers, of Deming, N. M."

Dr. Vickers: "I deeply appreciate the honor of being president of this Society, and especially of being the semi-centennial president. I am sure I have never done anything that might be construed as a reason for electing me to the presidency of this organization, but, as I am classified as a country doctor, I feel it is a particular honor to the country doctor, so will speak to you on 'The Country Doctor of the Future.'" The doctor affirmed that "we have discarded the habiliments which marked the doctor of other times. We hobnob with the business man; serve on his boards; belong to his clubs; play his games, and, along with him, subscribe to charities." But the average business man's hope and dominant ideal is to improve his own condition by making, buying and selling for profit, while the medical man's ideal is to lessen disease, and no one would knowingly employ a physician who could not prevent, if possible, that which he is prepared to treat. We have in the United States one hundred fifty-two thousand rural one-room schools, with more than three million pupils that as yet have not come under the consolidated school system. Many of these country people are more or less isolated. They need protection against contagious and nutritional diseases such as smallpox, diphtheria, scarlet fever, malaria, hookworm, pellagra, and rickets. They need early diagnosis in tuberculosis, syphilis, cancer, and other chronic diseases. These people have lost the crossroads doctor. He has died or moved away to the city to become a specialist and there is no prospect of his place being filled by the oncoming medicos. In one generation 50 per cent of the doctors have become specialists and now 50 per cent of the medical students select a specialty before they graduate. Specialism has come to stay and the advance to be made in medicine in the future will not be made by the country doctors like Jenner and Koch. It seems more likely the future discoveries will come from much cooperation in large centers by the correlation of work of many well-trained men." Dr. Vickers stressed the farming industry as basic to our national prosperity to a greater extent than in many other countries, and that our scattered peoples are entitled to the benefits of scientific knowledge, which is not discovered for the city people alone, so that public opinion should be so moulded as to foster some plan by which a small tax, with possibly a commdnity budget and other help, would guarantee small community centers for such outlying districts as have no medical care. "These people should not be denied what science has for the prevention and care of disease, and medical men should back some system to take the place of the good old country doctor who used to go to the people."

Adjournment for luncheon.

HOUSE OF DELEGATES

A meeting of the House of Delegates was held at 1:30 p. m., with the following members in attendance: President, Dr. F. D. Vickers (Deming); Secretary-Treasurer, Dr. L. B. Cohenour (Albuquerque); Dr. M. K. Wylder (Albuquerque); Dr. C. A. Miller (Las Cruces); Dr. R. S. Pousma (Rehoboth); Dr. L. A. Thompson (Springer); Dr. C. R. Bass (Cimarron); and Dr. R. O. Brown (Santa Fe).

Minutes of the Council meeting of May 19, 1932, were read and, on motion of Dr. Brown, seconded by Dr. Wylder, were ordered approved as read.

The Secretary, Dr. L. B. Cohenour (Albuquerque), read his annual report, as follows:

"Gentlemen: I hereby render a report of the affairs of the office of Secretary-Treasurer of the term ending with this session:

"At the Albuquerque meeting, May 20, 1931, there were a good many members suspended for nonpayment of dues, and, immediately following this, twelve members were reinstated. Three new members were admitted through affiliation with their county societies. One entire county, that of Eddy, is delinquent at this meeting.

"Members in the Society at this time are as follows:

	1931	1932
Bernalillo County	52	43
Chaves County	20	22
Colfax County	18	17
Curry County	10	12
Dona Ana County	11	12
Eddy County	5	
Grant County	18	11
Luna County	6	6
McKinley County	11	11
Santa Fe County	16	16
San Miguel County	5	9
Union County	9	8
Members at Large	37	29
Total in good standing		196

"No new applications for membership were received to be presented at this meeting. Membership this year is less than last year, partly because of removal from the State, and because of the general financial depression. Four deaths of members of the Society were reported as follows:

"Dr. Jesse George Holmes, Alamogordo, N. M., Oct. 14, 1931.

"Dr. David H. Lewis, Albuquerque, N. M., Oct. 29, 1931.

"Dr. E. D. McKinley, Alamogordo, N. M., May 17, 1932.

"Dr. J. O. Hatcher, Deming, N. M.

"Respectfully submitted,
(Signed) L. B. COHENOUR,
"Sec'y.-Treas."

Motion by Dr. R. O. Brown (Santa Fe) that report of the Secretary be adopted, was seconded by Dr. M. K. Wylder (Albuquerque), and carried.

The Secretary, Dr. Cohenour, read a letter from the Colorado State Medical Society, dated May 17, 1932 (Edward Delehanty, M. D., President), appointing Dr. George P. Lingenfelter, Denver, as Fraternal Delegate to carry the best wishes and the congratulations of the Colorado State Medical Society on the occasion of the New Mexico Medical Society's Semi-Centennial.

Dr. Cohenour also read extracts of a letter received from the American Medical Association in regard to Senate Bill No. 572 and H. R. 7525, known as Jones-Bankhead Bill, whereby it was proposed the Federal Government should cooperate with the states in promoting the welfare and hygiene of mothers and children, and urging opposition to these measures.

Dr. M. K. Wylder (Albuquerque) expressed the belief that it might be well for the Society to pass a resolution condemning these bills, and stated that he had written personally to Congressman Chaves and Braden and to Senator Cutting requesting their opposition to the measure; that Congressman Chaves had replied he would oppose it, while Congressman Braden stated his intention to support it since he thought it would greatly benefit rural communities. Senator Cutting replied that the measure would have his careful consideration and did not commit himself.

Dr. R. O. Brown (Santa Fe) expressed the belief that consideration should be given as to whether or not the Bill would benefit New Mexico, that while in general he did not see that such a measure would be highly desirable, yet in New Mexico, where there are not enough doctors to supply the rural communities or nurses to instruct midwives without Federal aid, it would be of value, and it would also be of value in the isolated communities of New Mexico where there are no doctors.

Dr. M. K. Wylder (Albuquerque) recited some experiences with Mexican midwives after they had received instructions and certificates from public health nurses in connection with work under the Sheppard-Towner Act, and made motion that the House of Delegates go on record as opposing Senate Bill 572 and H. R. 7525, known as the Jones-Bankhead Bill.

Dr. R. O. Brown (Santa Fe) suggested that Dr. J. R. Earp, Director of the State Board of Health, who was in the room, be asked to explain how the measure would affect the State.

Dr. J. R. Earp (Santa Fe) recalled that New Mexico is largely composed of counties that cannot afford to pay public health nurses and that, under the proposed Jones-Bankhead Bill, it would be possible to get funds from the Government and thus render assistance in furnishing nursing service in isolated communities, where such work is badly needed, since infant mortality in New Mexico is much higher than in other states, the rate being 132 per thousand, whereas no other state has a rate of over 100. Dr. Earp explained that the Bill had two divisions—one whereby the money would come directly from the Public Health Service, and the other whereby it would come from the Children's Bureau, and that the expenditure plans must be approved by a Council of three, to consist of the Surgeon General, a representative of the Children's Bureau and a representative of the Educational Bureau, disbursements to be made by the State Health Departments, after approval of its plans.

Dr. R. O. Brown (Santa Fe) explained that under the former Sheppard-Towner Act, money was appropriated to the states after budgets for the states had been approved by the Children's Bureau, and that a certain amount of freedom was allowed in determining how it should be used; that under the Jones-Bankhead Bill the State Board of Health would probably be allowed more latitude in the use of the funds allotted.

Dr. J. R. Earp (Santa Fe) stated that the money advanced under the Bill would be on the dollar for dollar basis, and, unless the State of New Mexico would increase its budget, he did not believe the Bureau of Health would benefit very much from it. He complimented the work of the public health nurses, stating that, with sixteen county health nurses, it had been possible to decrease the infant mortality rate from 144 to 132, and that the public health

(Continued on page 386)

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OUR SOUTHWESTERN MEETING

The annual meeting of the Medical and Surgical Association of the Southwest will return to Albuquerque this year. The dates selected are December 8, 9 and 10. That will avoid conflict with the Southern Medical Association and with the Radiological Society of North America, organizations which draw attendance from the Southwest. The chairman of the Program Committee is Dr. W. A. Gekler, of Albuquerque, and serving with him on this committee will be Drs. M. K. Wylder of Albuquerque, S. A. Schuster of El Paso, C. A. Thomas of Tucson, and David M. Davis of Phoenix. The Program Committee are planning to secure most of their scientific papers from the members of the Association, this year, rather than bring in many speakers from outside this district. Places on the program are open to any member of the Association who has material of interest to present.

Dr. W. R. Jamieson, of El Paso, is president of the Association; Dr. F. D. Vickers, of Deming, N. M., is president-elect. Full program is expected for the October issue of this journal.

DR. BEN MOEUR—OUR NEXT GOVERNOR

Unless all signs fail, the next governor of Arizona will be a physician, a country practitioner, who has never before held or aspired to any political office. The many friends of Dr. Moeur in the medical profession of Arizona hoped against hope and voted against their expectations, when we supported his campaign. The political machine seemed too strong for defeat by any man untutored in politics as it is played in Arizona, with limited financial resources, and comparatively unknown to the people of the greater part of the state. It is true that Dr. Moeur is known and respected by most of the citizens of Maricopa County, particularly of the "south side" where he has practised for more than thirty years, and in which part of the county he has been family physician in most of the homes. He also has a large consultation practice in and around Phoenix, but the practice of medicine does not make a man known to any section outside that in which he lives and works.

Dr. Moeur's success in the primary doubtless is due to two causes. The first of these is the dissatisfaction of people generally with present conditions in our national, state and local governments, and their determination to make as complete a change as possible. As usual, they acted with a vengeance when they did act, rejecting all candidates who had any affiliation, however remote, with the present state government, choosing the "amateur in politics" over professionals they could no longer trust.

The second reason is one which appeals to the writer. That is the instinctive confidence people have in Dr. Moeur's honesty and the good will which even brief contact with him engenders. The writer's first contact with him will illustrate this. As a young physician, newly located in Phoenix, he was called to attend a sick woman living northwest of the city. She asked for Dr. Moeur of Tempe as consultant, and he was communicated with and appointment made for the next day. Tempe was fifteen miles away and rapid transit in Phoenix in 1907 was by horse and buggy. In those days Dr. Moeur used a relay of double teams in his practice, often tiring out four pairs of fast trotters in one

day, making long trips over the entire county. He arrived at the patient's residence on time, with a sweating team, and his courtesy for the young physician just starting practice will ever remain a bright spot in memory. He made his examination, inquired into the treatment proposed, made some suggestions, assured the patient she was receiving the best possible care, told her he would be glad to come back in consultation if this became necessary but he was quite sure it would not be, and went his way leaving a satisfied patient and a new friend.

Whether his votes came chiefly from those who want a change or from his old and new friends, both groups are united in the belief that he will carry into this high office the personal characteristics for which he is well known,—honesty, square dealing, fearlessness, and determination to serve people who place their trust in him. Those qualities and experiences which endear a family physician to the people he treats are, after all, not so bad to have in the governor of a sick commonwealth. Luck to you Dr. Ben!

SHALL WE BE CONSISTENT?

"However the political scene may shift, facts and principles with reference to intoxicating liquor and the traffic in it remain the same.

"Alcohol is still a habit-forming, narcotic poison, striking at and striking down self-control, the last and most hardly won quality of human character.

"The liquor traffic is and always has been incurably lawless; and now just because of its shameless and open assaults on the law of the land, some of our citizens seek to free it from the shackles riveted upon it by the Eighteenth Amendment and the Volstead Act. After its long history of broken promises, it seems as if only a child could believe the asservations that, if so freed, it would obey the law, respect the rights of dry states, and never come back in the guise of the saloon.

"In view of these facts, we solemnly assert that we can never consent to our governments, national, state, or local, licensing the selling of beverages containing alcohol, a habit-forming narcotic poison, that we will never have part or lot in that proceeding, and that we will actively oppose it to the extent of our power.

"We also assert that we can never consent to our national or state governments going into the business of manufacturing or selling beverages containing alcohol, a habit-forming, narcotic poison, either directly or indirectly, that we will never have part or lot in that matter, and that we will actively oppose it to the extent of our power. We declare our conviction that no possible financial revenue to the government resulting from the legalizing of the beverage alcohol traffic can ever make up for the moral degradation and destruction of human values inevitably resulting from that traffic."

This is a somewhat abbreviated resolution adopted by a large convention which met in San Francisco during the summer. It is presented here because it expresses the viewpoint of many medical men, including the editor of this journal. We strongly suspect that it was drafted by a physician. Medical men who accept the teachings of therapeutics and pharmocologic research are in cordial agreement with the statements that alcohol is a depressant narcotic and not a stimulant, that it is a poison to neurologic tissue, and that it is habit forming. They only differ in their belief as to whether such a narcotic poison can be safely taken or administered to large numbers of the people without material damage to physical or mental well being. Nor is there any essential difference in their belief on this score, because most physicians advance as their argument for a change from present conditions the statement that young people are using more alcohol and are, therefore, suffering immeasurable physical and mental damage. Henry Ford stated the simple cure for this condition when he advanced the opinion that the cure for alcholic ills is not more and more easily procured alcohol, but less alcohol.

We commend the statements of this resolution to the thoughtful consideration of physicians generally.

EBER D. McKINLEY

(Alamogordo, N. M.)

We have failed to record the death on May 17, of Dr. Eber D. McKinley of Alamogordo, N. M., notice of which appeared in the Journal of the American Medical Association. Dr. McKinley was fifty five years old and had practiced in New Mexico since 1908. He was a member of the county and state medical societies, a Fellow of the American Medical Association and member of the Medical and Surgical Association of the Southwest. The cause of death was given as coronary embolism.

JOHN S. B. WOOLFORD

(Roswell, N. M.)

Information has come of the death on July 4 of Dr. John S. B. Woolford, of Roswell, N. M. The cause of death is given as uremia. Dr. Woolford has been living in Roswell for a number of years, but not in active practice for some time. He was a Fellow of the American College of Surgeons.

THE NEW MEXICO MEDICAL SOCIETY

(Continued from page 383)

nurses try to work with the doctors and cooperate with them at all times.

Further discussion followed, with result that no action was taken on the motion.

Dr. R. O. Brown (Santa Fe) made motion that the President appoint a committee to study the problem of providing medical attention in the small isolated and rural communities and report to the President at a future date. Seconded by Dr. M. K. Wylder (Albuquerque) and carried.

The Secretary, Dr. Cohenour, read a letter received from the American Medical Association relative to benefits derived by veterans. No action was taken.

The President appointed as Committee on Necrology, Drs. M. K. Wylder (Albuquerque), Dr. F. H. Crail (Las Vegas), and Dr. R. O. Brown (Santa Fe).

Also, Committee to deal with isolated community problems, Drs. R. H. Pousma (Rehoboth), R. O. Brown (Santa Fe), J. R. Earp (Santa Fe).

No further business arising, adjournment was voted at 2 p. m.

SCIENTIFIC SESSION

After call to order at 2 p. m., by the President, the Fraternal Delegate from Colorado, Dr. G. C. Lingenfelter (Denver), presented his credentials and expressed on behalf of Dr. Edward Delehanty, President, Colorado State Medical Society, congratulations and best wishes to the Society on its Fiftieth Anniversary, and extended a cordial invitation to all members to attend the Colorado State meeting to be held September 8-9-10, at Estes Park, Colorado.

Dr. W. S. Lemon, Rochester, Minn., presented the first paper on the program, entitled "Tuberculous Pleurisy with Effusion," dividing the subject into (1) "The Biologic and Investigative Aspect," and (2) "The Clinical Aspect." After carefully reviewing numerous experiments, Dr. Lemon advised, "It is possible to conclude that sensitization in man is the result of infection with the bacillus of tuberculosis, which excites an immediate response, and sets in motion a defense mechanism that is not specific for tuberculosis but is employed for all invading substances, although subject to variations required by such differences as may be included in the terms of dosage and virulence. It would seem that the initial lesion, a tubercle, is an immediate reaction, that involvement of the adjacent lymph nodes becomes possible by employment of the lymphatic vessels required for disposal of all removable organisms, and that the phagocytic defense is supplied, first, by polymorphonuclear leukocytes which are soon displaced by mononuclear cells, and that these become the characteristic cell of tuberculosis. It would appear that, in man, sensitization by the presence of tubercle is almost universal, and that all cases of pleural effusion seen in man are evidences of imbalance or increased permeability, made possible by the reactions of bacteria or by the products of bacteria on a sensitized pleura." Under "Clinical Aspect," Dr. Lemon concluded: "When advising patients of the diagnosis, of the care, and of the prognosis, of pleurisy with effusion, it is well to stress the importance of the element of time, both of the initial acute illness and of the period of observation. Patients should be advised of Korns' experience with his Chinese patients; namely, that as a rule: 'Those who rest most completely and longest have done well, whereas, conversely, those who have paid little attention to rest are now showing signs of active pulmonary tuberculosis. The conclusion seems justified that serofibrinous pleurisy of obscure origin, after proper means have been used to exclude other causes, should be considered as a manifestation of tuberculosis and should be treated as such."

Discussion was opened by Dr. L. S. Peters (Albuquerque), who expressed his thanks and appreciation of Dr. Lemon's paper, and his interest in the experiments conducted, which dealt with the introduction of foreign substances into the pleura, producing by their reaction the clinical syndrome of pleurisy with effusion, and which bear out more or less what he has encountered in pneumothorax work, as, in those cases which have been followed up with fluoroscopic examination and have been observed over a considerable period of time, an effusion has been shown at some time or other. "We see a number of cases in which the empyema follows lobar pneumonia and is not of the tuberculous type. In the course of my pneumothorax work, I have had a case of double effusion at the same time—effusion on the pneumothoric side and then on the parallel side. There have been only nine or ten such cases reported in the literature. It is not uncommon to see these cases of idiopathic pleurisies, showing pleurisy on one side, then being well for a number of years and then developing effusion on the opposite side. In regard to treatment of these tuberculous pleurisies with effusion, it can be summed up very well by saying, the less we do the better off they are. The average patient with pleurisy with effusion usually gets along all right with uneventful recovery in a reasonable length of time and, unless it is necessary to relieve pressure symptoms, it is not wise to aspirate."

Dr. Frank E. Mera (Santa Fe) stated that, "It is very true that we now rarely get pleurisy with effusion; years ago they were very common but that was before the idea of rest had permeated throughout the profession. Rest is very important in the early treatment of pneumothorax cases, and by this means we escape quite a few of these bothersome cases. As to the treatment of effusion, I believe, if I have erred, I have erred in waiting too long to aspirate, on account of the danger of secondary infection, as sometimes we get adhesions we might not otherwise have, thus spoiling the case as far as pneumothorax is concerned."

Dr. R. O. Brown (Santa Fe) expressed his enjoyment of Dr. Lemon's paper and remarked that one of the things which struck him particularly was the

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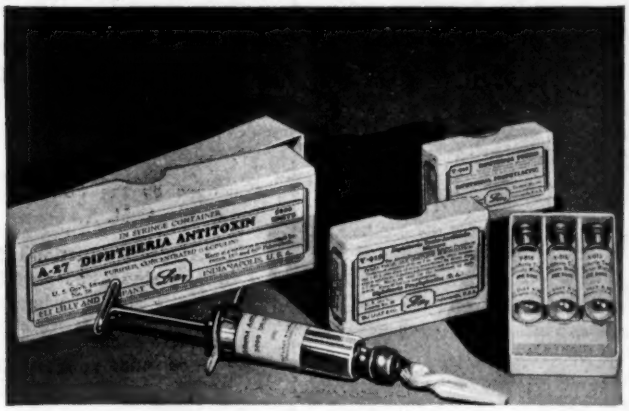

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fact that the reaction which occurs when a nonspecific substance is injected into the lungs or pleural cavity is essentially the same as that of a specific organism, such as tubercle bacilli or a live organism; thus we find the processes are really less complicated and obey a general rather than a specific law. Another point made was that, in the diagnosis of pleural effusion (which may be mistaken as influenza-pneumonia), some preceding condition might be responsible for it, for instance a localized pneumonia might have broken down some tubercles, and, therefore, pleurisy with effusion might be a complication rather than cause of disease.

In closing the discussion, Dr. Lemon thought it would be confusing rather than helpful to attempt to consider all the various problems that arise in a case in which there is tuberculous pleural effusion. "It is proper, however, to express an opinion regarding removal of fluid. From the cases studied, it is evident that serious injury can be done by hasty or ill-considered operation, or by the use of open drainage, if patients have either a serous or purulent effusion which, on culture, does not yield pyogenic organisms. No method of open drainage should be used for sterile fluids, regardless of their appearance, and no harm will be done if interference is delayed until the results of a culture can be obtained. From the standpoint of treatment, it is essential that all cases in which fluids are such as have just been described should be considered tuberculous, and I have felt that there were five working rules that might be used as indications for removal of fluid:

"1. Fluid may be removed by needle, for laboratory examinations, such as cultures for pyogenic organisms and organisms of tuberculosis, and for inoculation of animals by the methods that have been considered in the paper.

"2. If symptoms of pressure are present, producing respiratory or circulatory embarrassment, fluid should be removed. The symptoms usually are dyspnea, cyanosis, or tachycardia.

"3. When the chest contains so much fluid that it has caused mediastinal displacement, a sufficient amount may be removed to restore the mediastinum approximately to its normal situation.

"4. Pleural effusion that fails to be absorbed after an interval of time that would seem to be adequate for its absorption, may be withdrawn with justification.

"5. When the fluid is situated bilaterally, it should be removed. Occasionally, it is necessary to remove fluid more than once. Rarely, fluid needs to be removed on a large number of occasions. The indications, however, are the same in every instance.

"I have had no experience with removal of fluid and replacement with oxygen or air. There are theoretical grounds for believing that such a procedure might be of value, but my patients have responded satisfactorily to removal of the fluid only. Clinical experience also has shown that, whereas aspirating a large amount of fluid seems to stimulate further

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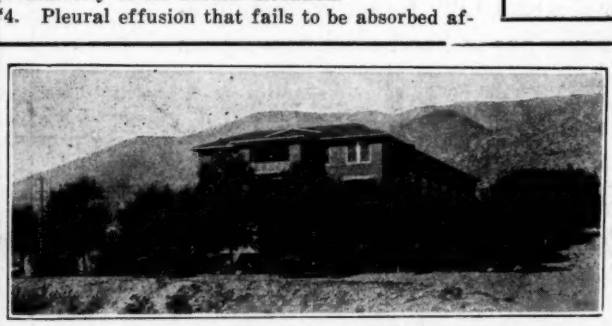

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exudation, aspirating a relatively small amount results in an augmented rate of spontaneous absorption. It is my experience that 5 to 20 per cent of patients who come with draining sinuses apparently resulting from simple, chronic empyema, are in reality suffering from tuberculous empyema. Obviously, these pleural cavities are infected with various types of organisms, and, even though tuberculosis may be shown to be present, yet the patients must be treated as are others with chronic empyema. The results of treatment, however, are not as satisfactory as in nontuberculous cases; only a limited number of patients recover without a persistently draining sinus."

Following Dr. Lemon's discussion, paper was presented by Dr. C. W. Irish, Pasadena, Cal., on "Neurological Diagnostic Criteria in Diseases of the Brain." Briefly summarized, Dr. Irish's paper presented practical diagnostic points in diseases of the brain, and: (1) A classification of cerebral circulatory disturbances, with some differential diagnostic aids particularly as to type and location of acute vascular lesions. (2) The various types of meningitis were discussed and the prominent symptoms at onset and most common neurological signs in their order of frequency, in a number of cases of the epidemic type, reported. A comparative differential chart of spinal fluid findings in the various types was included and the methods of administration and reported results of different types of treatment reviewed. Frequent brain dehydration and drainage and the early use of large amounts of serum early in the epidemic type was emphasized. (3) A tentative classification of encephalitis has been given and attention called to the diversity of symptoms in the chronic epidemic type and to its usual syndrome in children. (4) A few differential points in diagnoses of brain abscess, tumor, and the various types of traumatic cerebral hemorrhage have been mentioned and Kennedy's criteria of brain trauma given. (5) Diagnostic aid is offered in syphilis of the brain by examination reports of the cerebrospinal fluid and more liberal use of tryparsamide and fever therapy has been advised. (6) Disorders of motility due to

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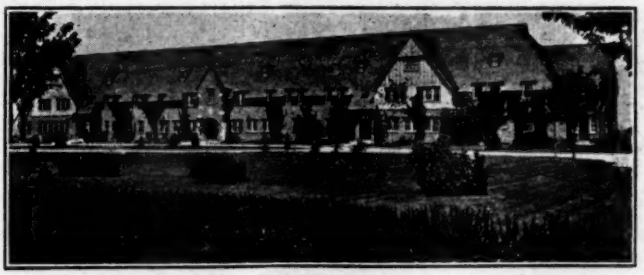

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basal ganglia disturbances and the usual resulting syndromes from their impairment and the cerebellar syndrome have been briefly described.

Discussion was opened by Dr. A. B. Stewart (Las Vegas, N. M.), who expressed his appreciation of Dr. Irish's paper and complimented him on his beautiful resume of diagnostic criteria of all diseases of the brain, which left absolutely no criticism. He advised that the paper be read more than once, when published in SOUTHWESTERN MEDICINE, in order that its full extent might be grasped and the thoroughness with which Dr. Irish covered the field fully comprehended.

Dr. A. H. Vogt (Albuquerque, N. M.) stated that he was very glad to hear such an excellent and exhaustive paper, and considered that the treatment of neuro-syphilis should fall into three groups, one group being benefited by the use of malaria; the second group by the use of triarsphenamine of bismuth, and the third by the old spinal puncture, which now seems to have fallen into disuse. Dr. Vogt suggested that the economic loss caused by this disease be seriously considered and that treatment be demanded for the protection of society.

Dr. F. D. Vickers (Deming) asked in regard to treatment by electric thermotherapy.

In closing the discussion, Dr. Irish stated that, in regard to electric thermotherapy, he did not believe it as acceptable as other forms of thermotherapy; that he was very appreciative of the discussion, as it had been his endeavor to stimulate interest in neurological problems.

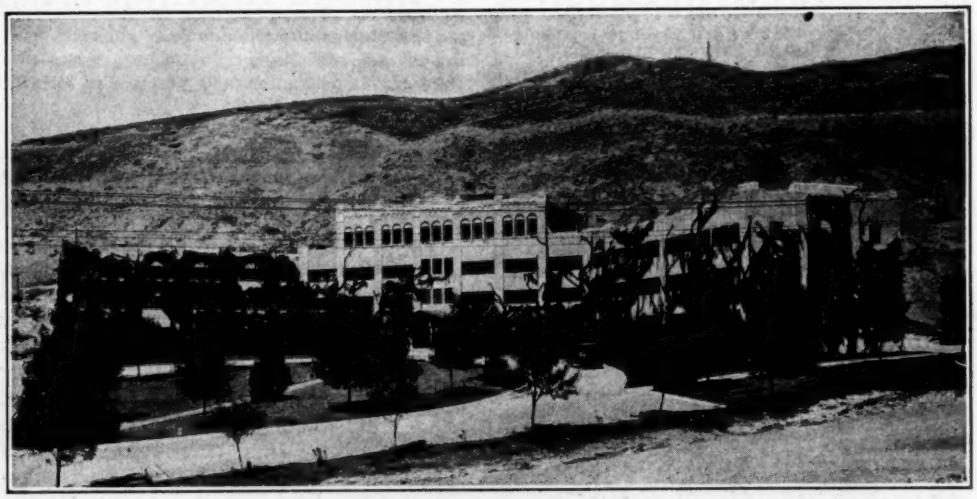
Adjournment followed until 8 p. m., to permit a visit to the Laboratory of Anthropology and afternoon tea at the home of its director, Dr. Nusbaum.

EVENING SCIENTIFIC SESSION

At 8 p. m., the meeting was called to order by the President, Dr. F. D. Vickers (Deming), who announced a paper by Dr. J. W. Hannett, Albuquerque, N. M., entitled "The Surgeon's Responsibility in Choosing an Anesthetic." Dr. Hannett stressed the importance of choosing the proper anesthetic in surgical cases and expressed the belief that all anesthetists should be graduates of medicine and be specially trained.

In discussion, Dr. P. G. Cornish, Jr., agreed with Dr. Hannett as to the extreme importance of the use of the proper anesthetic in any surgical work, as there is nothing more discouraging, particularly in abdominal surgery, than to have the patient given an unsatisfactory anesthetic. Dr. Cornish mentioned the fact that in the Southwest it is necessary to use a great variety of anesthesia for the reason that a large percentage of operations are done upon patients suffering from tuberculosis, and who are, therefore, poor surgical risks, so that the surgeon must be extremely careful in his choice of anesthetic. He believes that spinal anesthesia is the best anesthetic in the majority of poor risk cases.

Dr. E. W. Johns (Albuquerque, N. M.) complimented Dr. Hannett upon his paper, but took exception to the statement that all anesthetists should be graduates of medicine and should be specially



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trained, stating that many nurses make excellent anesthetists and give inhalation anesthesias in many of the large clinics, and, therefore, in his opinion, anesthetists could be developed from trained nurses.

In closing the discussion, Dr. Hannett agreed with Dr. Johns as to the use of non-medical graduates, at some of the larger clinics, as anesthetists, but considered that, for the comfort of the surgeon in the long run, in smaller places at least, it would be better to use doctors, as he felt strongly for keeping the practice of medicine among medical graduates and such procedure might save considerable embarrassment in case legal questions should arise.

Dr. W. D. Sansum, of the Sansum Clinic (Santa Barbara, Cal.), was then introduced by the President, and delivered an address on "The Treatment of Indigestion, Underweight, and Allergy, with the Old and New Forms of Digestive Agents.' Briefly summarized, Dr. Sansum's conclusions were:

(1) Errors in digestion on an organic basis are fairly common. (2) Simple, harmless digestive aids are now available and when used afford worth-while benefit. (3) Chronic underweight may be due to the inability to digest enough food. (4) Such patients, when given suitable digestive aids—such as citric acid, pepsin, enteric coated pancreatin and takadiastase as indicated—together with an adequate diet, improve in a very satisfactory manner. (5) All forms of allergy may be due, in part at least, to the inability to completely digest the complicated protein molecule, the absorption of which may cause sensitization. (6) Allergic patients usually improve slowly but surely when given protein digestive aids. Interesting case reports formed a part of Dr. Sansum's lecture.

Discussion was opened by Dr. R. O. Brown (Santa Fe), who made reference to cases of asthma and hay-fever, who apparently come to the Southwest to try climate as a last resort and are benefited by the altitude and sunshine if residence is continued over a considerable length of time, only to relapse after returning to a lower altitude. He affirmed, however, that, if such residence was continued for a period of eight to ten years, many times these persons could return to their former homes and live in comparatively good health.

Dr. C. H. Gellenthein (Valmora, N. M.) restricted his discussion to the underweight, which he gave as an important and common symptom of tuberculosis, stating that, when accompanied by fever and cough, these were sufficient for a diagnosis of tuberculosis. The cause of this loss of weight is probably due to poison, but other factors must be considered. Since this is essentially a wasting disease, in order to correct this underweight, the cause must be found, rather than the food supply be increased. A normal amount of food with enforcement of rest will, in the majority of cases, produce a steady gain

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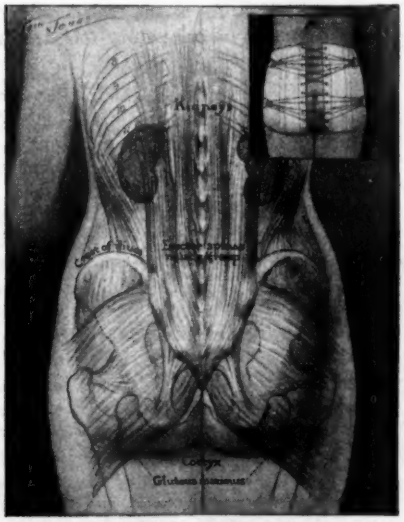

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in weight. He agreed with Dr. Sansum that underweight may be due to inability to digest.

Dr. Hugh T. Jones (Los Angeles, Cal.) asked as to the benefit sunshine might have in these conditions, saying that, while high altitudes usually have much more sunshine than low ones, yet California is known as the "Sunshine State," and he would like to know Dr. Sansum's experience in cases which come to California and if they are benefited by the sunshine without any other treatment.

Dr. Sansum, in closing the discussion, stated that sunshine helps everybody; that a very interesting experiment is now being conducted at the Sunshine Cottage, where the children under tratment are being given sunshine practically all over their bodies, with benefit in nearly every case. From a survey undertaken for this particular meeting, Dr. Sansum estimated that about one-third of patients, after being built up to normal weight, no longer needed digestive aids.

Dr. P. G. Cornish, Jr., (Albuquerque, N. M.), in a very interesting paper on "Some Phases of the Surgical Treatment of Pulmonary Tuberculosis," described two operations which he is performing with marked success in cases where there is a large open cavity and where pneumothorax has been tried and has failed. These operations, intrapleural pneumolysis and extrapleural pneumolysis, are designed to save patients from the larger disagreeable operation of thoracoplasty. Slides were shown in illustration.

In discussion, Dr. J. W. Hannett (Albuquerque) doubted if the profession at large realizes the seriousness and dangers from open cavities in the lung, asserting that open cavities are a constant menace.

Dr. L. S. Peters (Albuquerque, N. M.), continuing the discussion, stated that many of the medical profession have gained the idea apparently that tuberculosis is a curable disease, when, as a matter of fact, it is not, and the sooner this is realized and patients are taught to live with and despite their tuberculosis, the better off they will be. He had no quarrel with rest treatment and maintained that every patient should be given a chance to see what nature could do for his tuberculosis, but, after two or three months' bed rest, if no improvement or shrinkage in the cavity occurred, compression treatment should be advocated.

In closing, Dr. Cornish stated that it seemed probable many heads of tuberculosis sanatoria were not fully aware of the more recent methods of treatment of cavities, citing a case coming from an institution in a middle-western state, who, when thoracoplasty was advised, objected on the ground that he had been told at the former institution that this operation carried a mortality of more than 50 per cent. The Doctor stated that their mortality in these operations has been zero and the percentage of postoperative empyemas very low; hence, he felt this method of treatment extremely safe, as, in every case in which a cavity has been closed, it has remained closed and patients have remained free of symptoms.

The concluding speaker on the day's program, Dr. Lee M. Miles (Lovelace Clinic, Albuquerque, N. M.), presented a paper on "Inflammatory Stricture of the Ureter in the Female," citing six case reports as typical of the condition, stating that seven other cases of stricture had been diagnosed and treated during the past six months at the Clinic; hence, the fact that so many cases have been encountered in so short a period of time, indicates the condition is far from uncommon. The condition is characterized by rather indefinite but suggestive symptoms and quite definite physical findings. Stricture of the ureter can be definitely diagnosed by a systematic search of the upper urinary tract and, in most instances, treatment is successful in relieving symptoms and in dilating the narrowed zone of the ureters so as to permit free flow of urine to the bladder, thus preventing further damage to the kidneys. Illustrative slides were also presented.

In discussion, Dr. Harold T. Low (Pueblo, Colo.) stated that it has been the custom in his Clinic, in making diagnosis in all cases of abdominal pain, to consider urethral stricture, which is a very frequent condition, but that 33 per cent of all renal cases give absolutely no symptoms referrable to the urinary tract, which renders diagnosis difficult.

Dr. Dwight W. Rife (Santa Fe, N. M.) stated: "This condition is something we general practitioners will probably continue to miss because we are not G. U. men, and take the human body as a whole and not the urinary tract as being responsible. However, some general men have to do this kind of work, as their patients may be neither inclined, nor have sufficient funds, to visit specialists. Dr. Miles is certainly to be congratulated on his splendid paper and slides. As to the matter of focal infections, a great many inflammatory foci are due to kinking of the ureter."

In closing discussion, Dr. Miles mentioned that most of these cases have had multiple operations performed, gallbladder, salpingotomy, etc., and immediately after operation the patient seems improved, which would signify that the best treatment in any case is rest in bed. Soon after being up and around, following operation, however, these patients complain that the old pain has returned. "I believe that symptoms and physical findings of disease of the urinary tract are at least suggestive enough so that every general practitioner ought to have a definite idea that there is disease of the urinary tract regardless of urinary findings, which are suggestive but not necessarily the accompaniment of urinary tract disease. We could save patients lots of expense not to put them through exhaustive G. U. studies, x-ray findings, etc., if we would jump at the conclusion of urinary tract involvement and investigate that first, instead of after we have exhausted the patient's strength and finances. My particular point has been to diagnose these strictures early and treat them before extensive kidney damage results."

Adjournment until 9:30 a. m., May 20, 1932.

Friday, May 20, 1932

SCIENTIFIC SESSION—LENSIC THEATRE

The opening paper of the morning session was by Dr. A. Soiland (Los Angeles, Cal.), on "Management of Cancer of the Breast." Using a special sound picture, Dr. Soiland discussed and showed strides that have been made in the treatment of this condition, by means of platinum covered radium element needles, stating: "For breast cancer we employ needles varying in length from one to six centimeters, and in thickness from two to three millimeters. Each needle contains from one to four milligrams of radium element, determined by length, and these needles are plunged into the tissues surrounding the tumor, in positions which will place all malignant-cell-bearing areas under a direct crossfire. If we are dealing with a radio-sensitive malignant mass, a definite clinical cure may be expected from this method of treatment."

Dr. W. S. Lemon (The Mayo Clinic, Rochester, Minn.) continued with a paper on "Primary Carcinoma of the Bronchus," in which he brought out the value of bronchoscopic examination, which lends itself well to the diagnosis of those forms of benign tumors whose symptoms and signs may closely simulate those of carcinoma. Such tumors include adenomas, fibromas, fibrolipomas, and polyps, and to these may be added those malignant polypoid tumors that may be encountered and are the only malignant growths known to us that can be removed through a bronchoscope. The presence of such tumors in each case in our experience was suggested by a hemorrhage of unknown cause. More unusual was the presence in one cases of a dermoid which gave the appearance, symptoms, and signs of a malignant tumors, with the exception of the characteristic shadow in the roentgenogram. It was removed by repeated coagulation. The visualization of a lesion, the removal of tissue for histopathologic diagnosis, the removal of a polypoid growth, or the coagulation of benign growths that cannot be removed, are not the only purpose of bronchoscopic examination. Carcinomatous-like lesions produced by foreign bodies such as bone, or calcareous material, or true stone, in the lung, can be distinguished from carcinoma. In these ways, the examination complements and completes the clinical survey of interbronchial lesions and makes a diagnosis possible without the involvement of serious risk."

Concluding the symposium on cancer, Dr. C. G. Toland (Los Angeles, Cal.) spoke on "The Object of the Cancer Commission of the State Medical Association," and told of work being done in California, urging that such commissions be appointed by State Medical Associations. He stated that the menace of cancer has never been more acute than at the present time. It recently has jumped from sixth to second place as a cause of death in the United States and its apparent yearly incidence has increased by two per cent. Never has there been a more concert-

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ed and united attempt, on the part of layman and physician alike, to control cancer, than today.

Opening the discussion on the symposium, Dr. J. M. Flude (Los Angeles, Cal.) complimented the speakers on their excellent papers on the clinical aspect of the cancer problem and, as Field Representative of the American Society for the Control of Cancer, New York City, urged the formation of clinical groups, to act as consulting boards for doubtful cases of cancer occurring in their local communities. He stated that in the past year a number of such clinical groups have been organized throughout the United States. It is proposed that in each city there will be at least one such group, while state programs have already been inaugurated in Massachusetts, New York, Pennsylvania, California, Colorado, Oregon, and Wisconsin.

Dr. Hugh T. Jones (Los Angeles, Cal.) wondered why he, an orthopedic surgeon, was asked to discuss cancer of the breast and cancer of the bronchus, but cited a case of cancer of the breast where operation had been performed some thirteen years ago, x-ray showing very profuse metastasis of carcinoma to the bones. As we depend on the roentgenologist and men giving x-ray treatment in connection with the surgeon, so do we depend upon them to give palliative relief of pain in these very painful metastases.

Dr. C. H. Gellenthein (Valmora, N. M.) asked if carcinomas of the bronchus in region of the lung are more prone to metastases than others.

Further discussion was entered into by Dr. E. H. McIntyre (Santa Fe, N. M.), who urged careful and more accurate completion of death certificates insofar as cause of death was concerned, so that statistics on the subject would be more reliable. He also spoke in favor of the formation of cancer commissions by State Medical Societies, as outlined by Dr. Toland.

In closing, Dr. Toland stated that the object of the Commission is to correlate the information on hand regarding cancer before the medical profession and then, as soon as possible, to start to work to educate the public and give it the benefits of the knowledge attained.

Dr. Lemon in closing stated that, in the cases cited in his paper, 60 per cent were of the squamous type of carcinoma, 35 per cent were of the adenocarcinomatous type, and the rest were undifferentiated. Sixty per cent were grad 4, or very virulent, while 30 per cent were grade 3. About 3 per cent of the cases have no symptoms whatever and are accidentally discovered.

Adjournment until 2 p. m., for luncheon.

(Continued in next issue)

BOOK REVIEWS

SYMPTOMS AND DISEASES APPLIED: Questionnaires; Differential; Diagnosis; Mathematical Diagnosis. W. L. Kitchens, M. D Texarkana, U. S. A.

Perhaps the best understanding of this book will be presented in the words of the author taken from his preface: "In the preparation of the following

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pages, I . . . present . . . the most common symptoms and diseases found in the daily practice of the general practitioner, whereby, all following this plan of diagnosis will arrive at, and agree on, the same diagnosis, 'whether it be right or wrong.'"

As to the use of the book he says: "Question your patient thoroughly as to his or her chief complaints, giving the time, character, frequency, appearance, location, etc., according to the complaints. Number them as is shown in part one. . . . Laboratory tests you will number in the same manner as for the subjective symptoms. Now select the most positive, outstanding or diagnostic symptom, by number, and refer to that symptom which is listed on the same page in part two, as the number of the symptom; here you will find a list of diseases which should contain the diseases producing this symptom in your patient, and thereby eliminate all diseases except the ones found listed under this symptom; now you will select another diagnostic symptom and make reference to it as above and select the disease or diseases that appear here and also under the first symptom, and eliminate all diseases that do not appear under both symptoms. In this same way work out all the diagnostic symptoms and eliminate all diseases except the most applicable ones, making your positive, possible, and probable diagnosis or complications."

The reviewer is considerably at a loss to know just what to say regarding the practical value of this book. It is different from anything he has encountered—certainly for this reason should not be condemned. He considers that he has not been able to give it sufficient study to pass judgment upon it.

O. H. B.

SELECTIONS FROM THE PAPERS AND SPEECHES of John Chalmers DaCosta, M. D., LL. D.; Samuel D. Gross, Professor of Surgery at the Jefferson Medical College, Philadelphia; W. B. Saunders Company, Philadelphia and London; 1931.

This is a highly interesting collection of papers and addresses on a variety of subjects. The reviewer found the book so interesting that he read it from cover to cover. The addresses on The Trials and Triumphs of the Surgeon and Baron Larrey, the reviewer found especially interesting. Had the author rewritten the subject matter and avoided repetition, making a much smaller book, he would have made it still more interesting. From the work is gathered a splendid picture of the man DaCosta.

O. H. B.

TABLES OF FOOD VALUES, by Alice V. Bradley, B. S.; Supervisor and Instructor of Nutrition and Health Education, State Teachers' College, Santa Barbara, California. The Manual Arts Press, Peoria, Illinois. Price $2.00.

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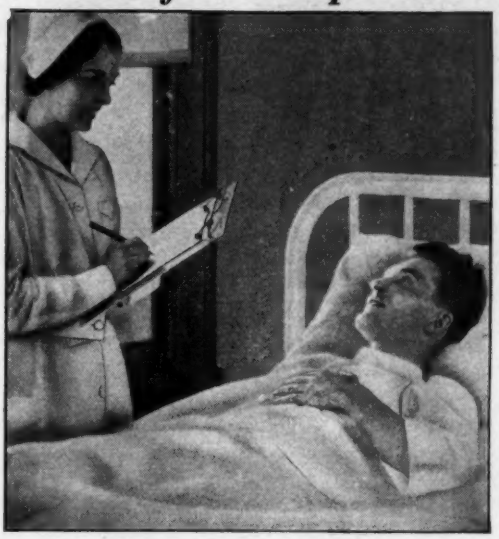

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